SERVICING & STORMWATER MANAGEMENT REPORT 273-275 RUSS BRADLEY ROAD

Project No.: CCO-22-1643-01

City File No.: D07-12-22-0187

Prepared for:

Trevor Watkins
273 & 275 Russ Bradley Road
Carp, Ontario K0A 1L0

Prepared by:

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115 Walgreen Road
Carp, ON K0A 1L0

Submitted: December 23, 2022

Revision 2: October 04, 2023

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Trevor Watkins to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed self storage facility, located on Russ Bradley Road within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Mississippi Conservation Authority (MVCA) and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-22-1643-01, C101 – Site Grading, Drainage, Erosion & Sediment Control Plan
- CCO-22-1643-01, C102 – Site Servicing Plan
- CCO-22-1643-01, PRE – Pre-Development Drainage Area Plan
- CCO-22-1643-01, PRE – Post-Development Drainage Area Plan

1.2 Site Description

The property is located at Russ Bradley Road within Ward 5. It is described as Plan 4R33191, Part of Lot 13, Concession 3 (Huntley), Geographic Township of Carp, City of Ottawa. The land in question covers approximately 2.43 ha and is located at the south corner of Carp Road and Russ Bradley Road.

See Site Location Plan in Appendix ‘A’ for more details.

The existing site is currently undeveloped with two gravel entrances from Russ Bradley Road. There are no sanitary, storm or water services on site however there is one fire hydrant in the right of way to the west of the site along Russ Bradley Road.

The proposed development consists of eleven storage buildings and one office/storage building. Parking and drive aisles will be provided throughout the site along with landscaping around the site perimeter. One existing site access will be maintained along Russ Bradley Road and one existing site access will be removed.

2.0 BACKROUND STUDIES

Background studies that have been completed for the proposed site include a topographical survey, geotechnical report and a hydrogeological investigation and terrain analysis.

Design drawings of the existing services on Russ Bradley Road were reviewed in order to determine accurate servicing and stormwater management schemes for the site.

A Sketch to Illustrate Topography of the site (22-2317) was completed by Mcintosh Perry Surveying Inc. (MPSI) and the Site Plan (SP-A01) was prepared by Deimling (latest dated December 16th, 2022).

The following reports have previously been completed and are available under separate cover:

- Geotechnical Report completed by Mcintosh Perry, dated December 23rd, 2022
- Hydrogeological Assessment & Terrain Analysis completed by Mcintosh Perry, dated December 23rd, 2022, Revised September 28, 2023
- Carp River Watershed/Subwatershed Study completed by Robinson Consultants, dated December 2004 (Report #00056)
- Novatech Hydraulic Network Analysis (R-2013-172) dated November 2014

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on June 3, 2021 regarding the proposed site. Specific design parameters to be incorporated within this design include the following:

- Control 5 and 100-year post-development flows to the 5 and 100-year pre-development flows, respectively, with a combined C value to a maximum of 0.50.
- Provide 300mm freeboard from the 100-year storage elevation.
- Quality control is required to be provided for the site (80% TSS Removal).
- Infiltration as per sub-watershed study for the Carp Road Corridor.

The notes from the City of Ottawa can be found in Appendix 'B'.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing private 300mm diameter PVC watermain within Russ Bradley Road, owned and operated by West Capital Developments. The existing watermain is intended for exclusive use for the purposes of fire protection and not for servicing. There is an existing hydrant directly adjacent to the existing site entrance along Russ Bradley Road.

4.2 Proposed Watermain

A new well has been drilled within the parking lot north of building A to provide the proposed development with domestic water supply.

It is proposed to extend the existing watermain within Russ Bradley Road approximately 12m towards Carp Road. A new 200mm diameter watermain is proposed to connect to the extended watermain within Russ Bradley Road. The proposed 200mm diameter watermain will be looped throughout the site in order to provide fire flow to three proposed private hydrants.

The Fire Underwriters Survey 2020 (FUS) method was utilized to determine the required fire flow for the site. FUS calculations were based upon Building F, which had the highest fire demand due to it's exposures. The buildings will be constructed from non-combustible materials, but in lieu of adequate fire ratings, the 'C' factor (type of construction) for the FUS calculation was assumed to be 1.0 (Ordinary Construction) to remain conservative. The total floor area ('A' value) for the FUS calculation was determined to be 743.2 m^2 but will include a fire separation as required by OBC, thus reducing the effective floor area to a maximum of 500m^2. The results of the calculations yielded a required fire flow of 6,000 L/min. The detailed calculations for the FUS and can be found in Appendix 'C'.

The water demands for the proposed buildings have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and can be found in Appendix 'C'. The results have been summarized below:

Table 1: Water Demands

Site Area	2.43 ha
Commercial	28,000 L/ha/day
Average Day Demand (L/s)	0.20
Maximum Daily Demand (L/s)	0.31
Peak Hourly Demand (L/s)	0.55
FUS Fire Flow Requirement (L/s)	100.0

As per the Novatech Hydraulic Network Analysis (R-2013-172) dated November 2014, the existing private network has accounted for approximately 63 L/s for 30 minutes of fire protection through the network. Based

on coordination between Novatech and City of Ottawa Fire Services, it was determined that in order to strike a balance between available fire flow and water age, 63.08 L/s of fire flow for 30 minutes would be acceptable for all areas of the development. It was further noted that the City can supplement flows with additional rural fire shuttle capabilities.

To confirm the adequacy of fire flow to protect the proposed development, public and private fire hydrants within 150 m of the proposed building were analysed per City of Ottawa ISTB 2018-02 Appendix I Table 1. The results are demonstrated below.

Table 2: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m (Assumed Class A)	Fire Hydrant(s) within 150m (Assumed Class A)	Combined Fire Flow Per ISTB 2018-02 (L/min.)
273-275 Russ Bradley Road	8,000	2 Proposed (Private)	1 Existing (Public) 1 Proposed (Private)	13,300

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is no existing sanitary sewer within Russ Bradley Road. The subject site is currently undeveloped and contains no sanitary infrastructure.

5.2 Proposed Sanitary Sewer

The subject site is a proposed self storage with a small office. A new septic bed located north of the proposed office building will be installed and sized to accommodate the development. Refer to septic design plans completed by McIntosh Perry, project no. CCO 22-1554, dated September 25, 2023 for full details on the proposed septic. These plans are being submitted to the Ottawa Septic System Office (OSSO) for the required permits and approvals.

Private Sewage Systems

- Approval for on-site septic treatment will be governed by the OBC as it is understood that the Daily Design Flow for the proposed office will be less than 10,000 litres per day.
- Septic systems will be constructed with all appropriate setbacks, treatment units and stipulations as per applicable Ontario Regulations.

For further design information pertaining to the on-site sewage system, please refer to the septic system application.

6.0 PROPOSED STORMWATER MANAGEMENT

6.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed buildings and directed to a proposed storage and infiltration area. Both parking lot and roof runoff will be directed to the proposed storage and infiltration area located along the northeast property line before being conveyed to the existing roadside ditch via a proposed enhanced swale. The emergency overland flow route for the proposed site will also be directed northeast toward the existing roadside ditch. Quantity and quality controls for the storm runoff for both the pre & post development conditions are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. These concepts will be explained further in Section 6.6.

In summary, the following design criteria have been employed in developing the stormwater management design for the site as directed by the MVCA and City:

Quality Control

- The site has been designed to achieve 80% total suspended solids removal as per the MVCA.

Quantity Control

- Post-development flow 5/100-year is be restricted to match the 5/100-year pre-development flows respectively, with a maximum pre-development C value of 0.50.

6.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where C = Runoff coefficient
I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)
A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any SWM facility sized using this method is expected to function as intended.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the *City of Ottawa - Sewer Design Guidelines*, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

As per direction from the MVCA, the time of concentration (Tc) used for pre- and post-development flows shall be calculated and no less than 10 minutes.

6.3 Pre-Development Drainage

The subject property currently surface drains to the northwest. The existing site drainage limits are demonstrated on the Pre-Development Drainage Area Plan. The time of concentration was calculated to be 15 minutes. A summary of the Pre-Development Runoff Calculations can be found below.

Table 3: Pre-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (5/100-Year)	Time of Concentration (min)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
A1	2.43	0.21/0.27	15	119.04	254.44
Total	**2.43**			**119.04**	**254.44**

See CCO-22-1643-01 - *PRE* in Appendix 'E' and Appendix 'G' for calculations.

6.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-1643-01 - *POST* in Appendix 'F' of this report for more details. The time of concentration was calculated to be 15 minutes for area B2, whereas 10 minutes was used for area B1 to remain conservative. A summary of the Post-Development Runoff Calculations can be found below.

Table 4: Post-Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (5/100-Year)	Time of Concentration (min)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
B1	1.458	0.64/0.76	10	269.11	549.39
B2	0.966	0.45/0.54	15	101.15	206.42
Total	**2.425**			**370.26**	**755.81**

See Appendix 'G' for calculations. Runoff for area B1 will be restricted prior to outlet to the enhanced swale northeast of the infiltration and storage area. The flow will be controlled by a 150mm diameter culvert outlet and a 0.95m wide earth weir. Area B1 will be over-controlled to account for the unrestricted flow leaving the site from Area B2. Quantity and quality controls will be further detailed in Sections 6.5 and 6.6.

6.5 Quantity Control

The 5 -and 100-year post-development runoff for this site has been restricted to match the 5- and 100-year pre-development flow rate with a maximum combined C value of 0.50. (See Appendix 'B' for pre-consultation notes). These values create the following allowable release rate and required storage volumes for the site.

Table 5: Allowable Release Rate Summary

Drainage Area	Area (ha)	Runoff Coefficient (5yr/100yr)	Required Restricted Flow 5-Year (L/s)	Required Restricted Flow 100-Year (L/s)
A1	2.425	0.21/0.27	**119.04**	**254.44**

See Appendix 'G' for calculations.

Reducing site flows will be achieved through the use of flow restrictions which will create the need for on-site storage. Runoff from drainage areas will be restricted as shown in the table below.

Table 6: Post-Development Restricted Runoff Summary

Drainage Area	Post Development Unrestricted Flow (L/s)		Post Development Restricted Flow (L/s)	
	5-Year	100-Year	5-Year	100-Year
B1	269.11	549.39	11.97	48.00
B2	101.15	206.42	101.15	206.42
Total	**370.26**	**755.81**	**113.12**	**254.42**

See Appendix 'G' for calculations.

Runoff from Area B2 will be unrestricted and maintain existing drainage patterns. Runoff from Area B1 will be captured and restricted in a depressed storage area. A weir and pipe combination will be used to restrict flow from Area B1 to the allowable release rate.

In the event that there is a rainfall which exceeds the 100-year storm event or there is a blockage within the storm sewer system, stored runoff will overtop the berm at an elevation of 114.56, providing 300mm of freeboard to the highest WSEL. Runoff will outlet to the existing municipal ditch NW of site in an emergency situation. A storage summary can be found in ***Table 7***, below.

Table 7: Storage Summary

Drainage Area	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)
	5-Year			100-Year		
B1	0.23	275.92	277.41	0.36	446.98	459.40

The depressed storage area will have a maximum release rate of 48.00 L/s and provide up to 446.98 m^3 of storage during the 100-year event. The water level (WSEL) during the 100-year event will be 114.26, corresponding to a ponding depth of 0.36m. The maximum release rate during the 5-year event will be 11.97 L/s. The water level (WSEL) will be 114.13 during the 5-year event, corresponding to a ponding depth of 0.23m.

See Appendix 'G' for calculations.

6.6 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

The enhanced grassed swales have a variant cross-slope and a drainage conveyance slope of 0.5% to slow down the stormwater which creates an opportunity for infiltration and removal of total suspended solids. It is suggested that the grassed swale be evaluated yearly to determine if the amount of suspended solid accumulation requires removal. The minimum travel path of water through the swale is approximately 73 m providing sufficient total suspended solid removal to satisfy the requirement of 80%. Table 8 provides the criteria and proposed conditions the enhanced grassed swale will be subjected to.

Table 8: Enhanced Grassed Swale Requirements

No.	Design Element	Design Guidance	Proposed Works
1	Drainage Areas	Less than 2 hectares	Each swale receives flows from less than 2 hectares or area.
2	Soils Type	Soil percolation rate should be greater than 15mm/hr	Extended detention has been provided to allow for additional opportunity for infiltration.
3	Water Table Depth	The seasonally high-water depth should be greater than 1m below the bottom of the enhanced swales	Long term GWT monitoring was completed and confirmed a minimum of 300mm separation is provided between the bottom of the SWM facility and the GWT, as recommended by the *Ottawa Low Impact Development Technical Guidance Report.*

4	Bedrock Depth	The depth to bedrock should be greater than 1m below the bottom of the enhanced swales	As per the Geotechnical Report, bedrock is greater than 1m below enhanced grass swale.
5	Cross-Section	Bottom width: >0.75m Side slopes: 2.5:1 (Typical) Maximum Depth of Flow: <0.5m (Typical) Channel Slope: <4%	Bottom width: 0.75 - 1.0m Side slopes: 3:1 Max Depth of Flow: <0.5m Channel Slope: 0.50%
6	Flow Velocity	Convey the peak flow from a 4 hour 25mm Chicago storm with a velocity <0.5m/s	Channel slopes will be limited to 0.5% and the resultant flow velocity will be less the 0.5 m/s.
7	Swale Length	>5m	The swale is greater than 5m in length.
8	Permanent Check Dams	To promote infiltration of stormwater and the settling of pollutants, permanent check dams can be constructed at intervals along the swale systems	The outlet functions as a check dam. The length of the swales does not warrant intermediary check dams. However, a check dam has been added just upstream of the dry retention area to demonstrate quality storage requirements as per Table 3.2.
9	Major System Events	Grassed swales must be evaluated under major system and minor system events to ensure that swales can convey these storms effectively	The major storm events are anticipated to crest the banks. Detailed calculations will be provided

From Section 3.2.2 of the MECP Stormwater Management Planning and Design Manual, a base level of water quality was determined using the site area, imperviousness, and the proposed retention volume. Based on Table 3.2 of the of the manual, the proposed development will be able to achieve a minimum of 60% TSS removal given the proposed stormwater retention volume of 446.98 m^3 during a 100-year storm within the proposed infiltration area. It should be noted that 60% TSS removal is based on a dry pond with continuous flow, whereas this development will have intermittent flow during rain events only, thus the actual TSS removal rate will be increased. The combination of water retention, enhanced grass swales, and rock flow check dams (which have been designed to minimize flow velocities and encourage sedimentation) will contribute to increasing TSS removal and together will provide a sufficient level of quality control to meet the quality requirements for the development.

6.6.1

Flow not collected within the proposed enhanced swales will be directed to vegetated areas with low slopes and tall grass which will encourage filtration and provide a level of TSS removal prior to leaving the site.

Infiltration

In addition to providing quality control for stormwater runoff, the proposed development is within the Carp Road Corridor Community Design Plan which identifies the subject property as a high groundwater recharge area. The Carp River Watershed/Subwatershed Study sets a target for high groundwater recharge areas of 230mm/year of infiltration.

In order to meet the required infiltration target, an infiltration area has been designed for the site as per the *Credit Valley Conservation Authority (CVC) and Toronto Region Conservation's (TRCA) Low Impact Development Stormwater Management Planning and Design Guide (2010)* and the *Ottawa Low Impact Development Technical Guidance Report.* Storm runoff from the site will be directed to the infiltration area.

The infiltration area will be constructed along the northeast end of the site. The infiltration area will have a flat bottom with a bottom width varying from 4m to approximately 8.6m. The bottom of the infiltration area will be founded on native soils at an elevation of 113.90, which is approximately 0.38m above the seasonally high groundwater elevation of 113.53. Based on long term groundwater monitoring results included in Appendix H of the Hydrogeological Assessment, separation from the groundwater table will increase outside of the spring season. Existing elevations at the bottom of the proposed infiltration area vary from approximately 113.60 to 114.70.

Due to site constraints such as poor hydraulic conductivity and high groundwater levels, the design has incorporated recommendations from the *Ottawa Low Impact Development Technical Guidance Report*. As per the recommendations within Section 3.5.2, approximately 101.3 m^3 of storage will be provided below the outlet invert to allow an extended opportunity for runoff to infiltrate. Side slopes of 3:1 are proposed to provide as much hydraulic head as possible over the infiltration practice. As per section 3.5.3, long term groundwater monitoring has been completed to demonstrate that high groundwater conditions will primarily be limited to the spring season.

Design criteria from the *Credit Valley Conservation Authority (CVC) and Toronto Region Conservation's (TRCA) Low Impact Development Stormwater Management Planning and Design Guide (2010)* and *Ottawa Low Impact Development Technical Guidance* Report are noted in the following table:

Table 9: Infiltration Area – MECP & Ottawa LID Requirements & Recommendations

No.	Design Element	Criteria	Proposed Works
1	Water Table Depth	**CVCA/ TRCA Guidelines:** The seasonally high water depth should be greater than 1m below the bottom of the soakaway pit	The site has been raised to provide as much clearance as feasible above the groundwater table.
		Ottawa LID Guidelines (Recommendation 4): Provide continuous groundwater monitoring to assess if poor infiltration conditions may be limited to a single season.	Groundwater monitoring results included within the Hydrogeological Assessment indicate that high groundwater conditions are primarily limited to the spring season.
2	Depth to Bedrock	**CVCA/ TRCA Guidelines**: The depth to bedrock should be greater than 1m below the bottom of the soakaway pit	Depth of bedrock is greater than 1m below the bottom of the infiltration area.
		Ottawa LID Guidelines (Recommendation 2): Additional investigations are required where	

		1m separation from the bottom of the LID area to bedrock cannot be achieved.	
3	Soils	**CVCA/ TRCA Guidelines**: Soil percolation rate should be greater than 15mm/hr	The infiltration area has been designed to promote infiltration in soils with poor percolation rates.
		Ottawa LID Guidelines: To encourage infiltration in soils with low hydraulic conductivity, it is recommended to maintain a hydraulic head over the point at which hydraulic conductivity slows to negligible levels. This is achieved by allowing water to remain within the storage reservoir below the outlet and increasing side slope to bottom ratios.	The bottom of the storage area has been designed to be 9cm below the outlet, providing up to 101.3 m^3 of storage and extending the opportunity for infiltration. 3:1 side slopes are proposed to provide additional hydraulic head.
5	Location	**CVCA/TRCA Guidelines:** >4m from buildings	Infiltration Area is >4m from all buildings.
		Ottawa LID Guidelines: >4m from Buildings	

An infiltration rate of 2.5 mm/hr has been utilized in the infiltration calculations. This rate was derived from the October 2022 infiltration testing completed within the proposed storage and infiltration area. A factor of safety of 8.5 was applied to the lowest measured infiltration rate of 21.18 mm/hr to apply a conservative estimate. See Appendix 'G' of the Hydrogeological Assessment for October 2022 infiltration testing results.

To promote infiltration, the storage area outlet is designed to be 0.09m above the bottom of the infiltration area. Based on the infiltration requirement of 230mm/year and the site area of 2.425 ha, it has been determined that 6mm of rainfall from area B1 will need to be infiltrated per 5mm<x<25mm event, of which 51 are expected to happen per year. To provide storage for 6mm of rainfall from area B1, a storage volume of 87.50 m^3 will be required below the outlet. The proposed SWM facility will provide 101.3 m^3 of storage below the outlet, exceeding this requirement. The drawdown time, based on the resulting 0.82 L/s infiltration rate and the required storage volume of 87.50 m^3, is anticipated to be 1.23 days, whereas there will be on average 7.1 days between events. An infiltration summary has been included in Table 10, below. Refer to Appendix 'G' of the Servicing Report for detailed calculations.

Table 10: Infiltration Summary

Site Area	2.425 ha	
Infiltration Requirement	230 mm/year	5577 m^3 / year
Average Event 5mm<x<25mm	11.88 mm/event	51 events / year

Infiltration In Pervious Area	6mm per event	1,592 m^3 / year
Infiltration within Infiltration Area	6mm / 87.50m^3 per event	4,462.70 m^3 / year
Total Infiltration Per Year	**55,77 m^3 / year Required**	**5,861 m^3 / year Provided**

7.0 EROSION AND SEDIMENT CONTROL

7.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the *Site Grading, Drainage and Sediment & Erosion Control Plan* for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

7.2 Permanent Measures

Rip-rap will be placed at all locations that have the potential for concentrated flow. It is crucial that the Contractor ensure that the geotextile is keyed in properly to ensure runoff does not undermine the rip rapped area. Additional rip-rap is to be placed at erosion prone locations as identified by the Contractor / Contract Administrator / City or Conservation Authority.

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

8.0 SUMMARY

- New self-storage buildings are proposed to be constructed at 273-275 Russ Bradley Road;
- A new well will including a 50mm diameter watermain will service the proposed office building for domestic cold water;
- A new 200mm diameter water service will be extended from the existing 305 mm diameter watermain within Russ Bradley Road for fire protection. There three proposed private hydrants to supply fire flow throughout the site;
- A new septic system will be installed to service the site;
- The majority of the site will sheet flow to a depressed storage and infiltration area before being restricted at the outlet;
- Storage for the 5- through 100-year storm events will be provided within the depressed storage area;
- Infiltration will be promoted by raising the storage area outlet 0.09m above the bottom of the infiltration area; and
- An enhanced grass swale will be constructed to promote infiltration and removal of total suspended solids.

9.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Servicing and Stormwater Management Report in support of the proposed development at 273-275 Russ Bradley Road.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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10.0 STATEMENT OF LIMITATIONS

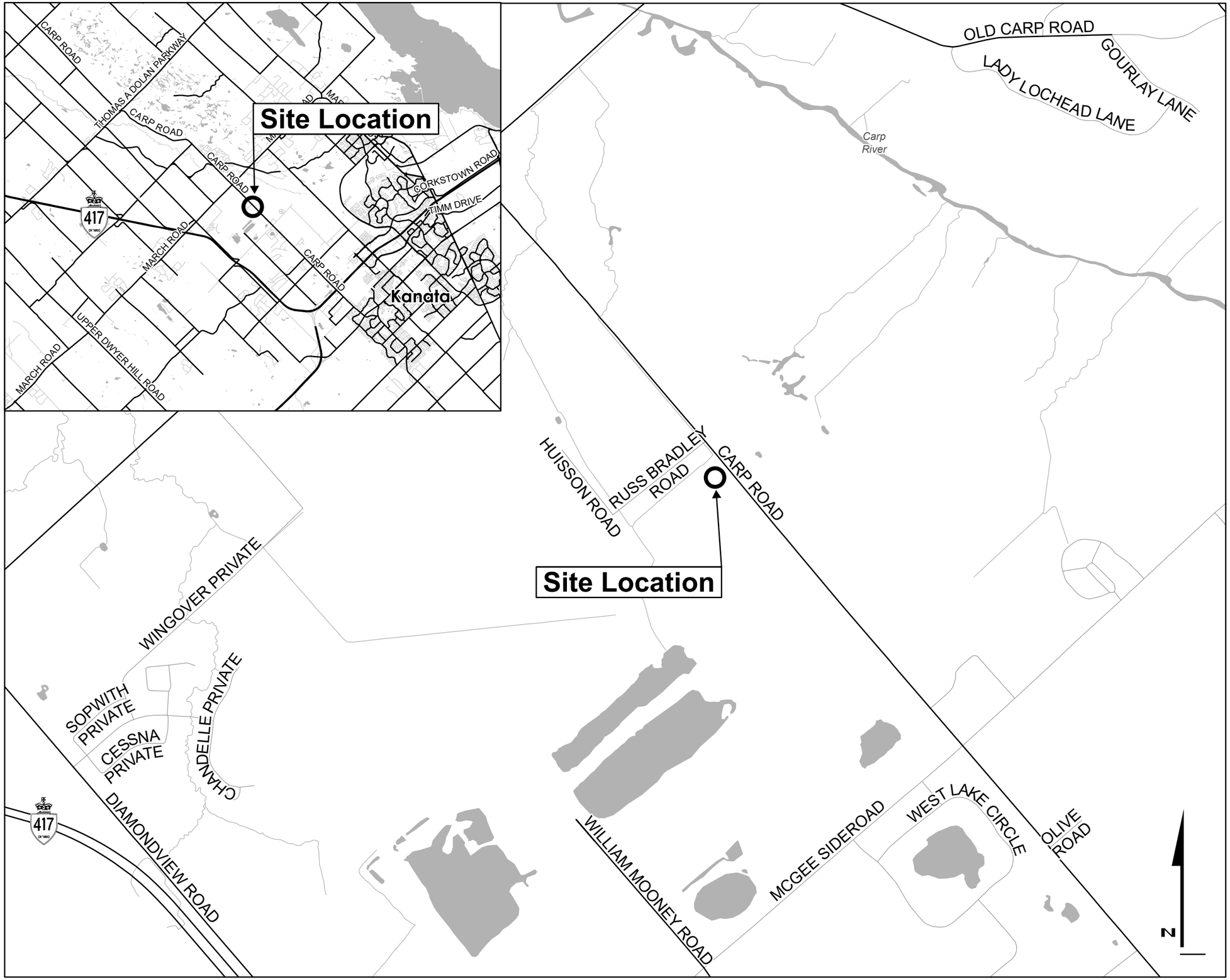
This report was produced for the exclusive use of Trevor Watkins. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Conservation and Parks, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN

McINTOSH PERRY



LEGEND

SiteLocation

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2022.

0 250 500 1,000

Scale 1:15,000 Metres

CLIENT: TREVOR WATKINS

PROJECT: 1500 THOMAS ARGUE ROAD EIS

TITLE: KEY MAP

McINTOSH PERRY
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PROJECT NO:CCO-22-2620		FIGURE:
Date	Jul., 15, 2022	1
GIS	MG	
Checked By	EP	

APPENDIX B
BACKGROUND DOCUMENTS

McINTOSH PERRY

Site Plan Pre-consultation

Meeting Date: June 3, 2021

1500 Thomas Argue Road

Applicant: Trevor Watkins **Consultant:**N/A

Ward 5 **Councillor** Eli El-Chantiry

Proposal Summary: The applicant proposes to build in phases and operate a fully automated indoor/outdoor self-storage facility.

Attendees:
Trevor Watkins, Applicant/Owner
Harry Alvey, Project Manager, PIEDD, City of Ottawa
Seana Turkington, Planner, PIEDD, City of Ottawa
Mark Gordon, Planner, PIEDD, City of Ottawa
Sean Harrigan, Planner, PIEDD, City of Ottawa
Sami Rehman, Environmental Planner, PIEDD, City of Ottawa
Alexandra Labuda, Planning Assistant, PIEDD, City of Ottawa
Erica Ogden, Environmental Planner, MVCA

Comments and Meeting Notes

Proposal Details

- Proposed site plan control application to construct a fully automated indoor/outdoor self-storage facility for vehicles, boats, recreational vehicles, and other personal items. The outdoor storage will also include a section for a boat lift/dock inventory. The property will be fenced with chain-link and barbed wire for increased security. There will also be an electronic vehicle control gate and the property will have 24-hour video security. The buildings will not be heated and will be sized to eliminate the need for fire suppression. No staff are expected to be on site. Access will be provided off Russ Bradley Road.

Technical Comments - City Staff

Planning (Provided by Seana Turkington)
Official Plan and Zoning By-law

- As per Schedule A of the Official Plan, the site is designated 'Carp Airport' and is Zoned 'Air Transportation Facility Zone' (T1B) as per the City's Zoning By-law.

3.10.2 – Carp Airport

- The Carp Airport is designated on Schedule A with the intent of providing airport facilities that serve the general aviation needs in Ottawa.
- The land uses permitted in the designation are aviation and other land uses associated with an airport including an aerospace business park and an accessory residential fly-in community consistent with the Carp Airport master land use and servicing plan.
- The purpose of the T1-Air Transportation Facility Zone is to:
  1. permit air transportation facilities and aviation-related uses in areas designated as **Ottawa Macdonald-Cartier International Airport** and **Carp Airport** in the Official Plan, and
  2. permit a range of employment uses and airport-related commercial and industrial uses at the Ottawa Macdonald-Cartier International Airport.

Air Transportation Facility Zone (T1B)

- The following uses are permitted in the general T1 Zone: airport and related facilities, light industrial uses, parking garage, parking lot, truck transport terminal, warehouse.

- In the T1B Subzone, the following uses are also permitted: convenience store, heavy equipment and vehicle sales (rental and servicing), hotel, instructional facility, office, one dwelling unit for a caretaker or security guard, park, personal service business, place of assembly, post secondary educational institution, research and development centre, restaurant (full service), restaurant (take-out), retail store (limited to a factory outlet store), service and repair shop, storage yard.

In the T1B Subzone, the provisions of the table below apply:

Zoning Mechanisms	**Zone Provisions**
Minimum setback from a lot line for a dwelling unit (m)	12
Minimum setback from a lot line for an accessory building (m)	12
Minimum setback for buildings other than a dwelling unit or an accessory building	(i) Rear Yard 7.5 (ii) Front Yard 12 (iii) Corner Side Yard 12 (iv) Interior Side Yard 4.5
Maximum lot coverage (%)	50
Minimum Distance Between Buildings on the same lot (m)	10
Minimum Landscaped Buffer abutting Carp Road, an RR zone or any other non-industrial or non-transportation zone (m)	10
Minimum setback for a gasoline pump island or storage tank from an RR zone (m)	150

Site Plan

- The final site plan must show parking, storage, and fire routes as well as watercourse setbacks (regulated under Section 69 of the Zoning By-law). For additional information on preparing studies and plans, please click on the following hyperlink: Guide to Preparing Studies and Plans.
- Landscaping should be provided on site, in accordance with the Carp Road Community Design Plan (to act as a screening measure) and also to provide some vegetation on site. It is recommended that vegetation on site be species native to the Ottawa area. Take a look at: https://ottawa.ca/en/living-ottawa/environment-conservation-and-climate/wildlife-and-plants/plants

Parking

- As per the City's Zoning by-law, isles to reach self-storage units are not permitted to be used as parking spaces. The applicant should refer to the layout of other self-storage centres in the city to see the site operation and determine the site configuration required. Parking requirements are detailed in Part 4 of the Zoning By-law.
- The drive aisle proposed on site must also meet the Private Approach By-law: https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/private-approach-law-no-2003-447

Carp Road Corridor Rural Employment Area

- The Carp Road Corridor Rural Employment Area plays an important role in the development and well-being of the local economy. The diversity and the ability to attract a range of traditional and high technology industries

as well as environmental services, some value-added processing, wood and metal fabrication and commercial uses has been one of the strengths of the Corridor. The vision for this area is contained in the Carp Road Corridor Community Design Plan. New development applications will conform to the policies in the approved community design plan.

- The community design plan for the Carp Road Corridor shall provide direction to the Zoning By-law for future land uses. [Amendment #180, November 8, 2017]
- The subject property falls within the Carp Road Corridor Community Design Plan, which provides and action plan for future development in the corridor. It considers land use, environmental protection, and servicing, visual appearance and land use compatibility amongst other strategies for achieving community objectives.
- The CDP provides design guidelines for industrial and business parks (see section 7.3). Please identify how these guidelines have been met in your planning rationale and site plan.
    - Locate parking at the rear or side of buildings. Where this is not possible and parking is required at the front or side of the building a greater setback from the property line should be required to permit planting to mitigate the effects of the parking area (e.g. parking screened from view).
    - Locate storage and service areas at the rear of buildings except on sites where the property backs onto Carp Road or the main entry road.
    - Preserve as many trees as possible on the site. Compensate for removal of existing trees by extensive planting in the open space corridor, entry features “gateways” and on-site landscape areas. Plant trees along the corridor – an informal mix of trees and shrubs is preferable, with more coniferous than deciduous species.
    - Provide landscaping at the front of buildings. Use landscaping, decorative fences to screen unsightly uses.
    - Create entry feature (“gateways”) for new subdivisions/parks. This should include a sign and landscaping with the name of the development and the park occupants and enhanced lighting for visibility at night.
    - Provide for turning lanes where warranted.

Development Submission & Additional Info

- This site is within the Carp Airport subdivision. For further information on the subdivision as a whole, as well as any pertinent agreements, please speak with the Owner of the subdivision.
- Prior to submitting a site plan control application, the applicant should speak with the ward Councillor about the proposal and contact Building Code Services. Development Charges associated with Building Permits may also apply.
- It is advised that the applicant contact the Carp Airport Authority.
- Given the studies and plans this proposal will require, it is recommended that a Consultant for Engineering and Planning be hired.
- Please note that a draft of the New Official Plan was released publicly in November 2020. The New Official Plan is scheduled to go to Council this Fall for a decision. If a formal application is submitted, depending on timing, the policy regime may change. If a formal application is submitted prior to September 2021, the required planning rationale should speak to compliance with policies in the New Official Plan.

Engineering (Provided by Harry Alvey)

- The applicant will need to provide SWM management for this site. Given that this is a commercial site, it will probably need an ECA for the SWM. The MECP is taking approximately 9 to 11 months to process these permits. Design is to be based on Post- to Pre- storm events. If the airport will allow a SWM Pond the SWM ponds are required to have 300mm freeboard above the 100-yr storage elevation. If an OGS is proposed for Quality Control a ETV Protocol is required.
- SWM discharge is required to have an enhanced level of water quality of 80% TSS removal.
- There is a stormwater course which provide stormwater runoff from the airport to the Carp river located along the south side of Russ Bradley Rd. that should have capacity for the SWM discharge from your site. This should be confirmed by your engineer at time of engineering submission. The water course(s) must be

maintained at or better then the current level of flow & service. In addition, this might be fish habitat. It is suggested you contact MVCA regarding any proposed work with these water courses.

- The applicant should contact Allen Even at OFD regarding fire protection requirements and possible need for storage tanks for fire fighting.
- The applicant should contact the Carp Airport Authority regarding any flight operations restrictions on the site.
- If in the future it is decided to create an onsite office space, then a Hydro-G will be required prior to a building permit. Note: there are a number of issues with the ground water quality in the area.
- Please provide 'flattened' *.pdf versions of documents that include no 'comments' or 'edits' and represent what final printed version will look like.
- Contacts for the following are: OFD: Allan Evans, P.Eng Fire Services engineer - allen.evans@ottawa.ca

Environmental Planning (Provided by Sami Rehman)

- The proposal triggers an Environmental Impact Statement (EIS), which should cover the following:
    a. Potential significant wildlife habitat, as part of the natural heritage system (OP 2.4.2)
    b. Potential significant habitat for threatened or endangered species (OP 4.7.4)
    c. The appropriate setbacks from the watercourse (OP 4.7.3)
    d. Potential impacts of short and long-term outdoor vehicle and machinery storage on the natural features, and surface and groundwater features
    e. Opportunities for energy conservation and shading with the site's design and landscaping (OP 4.9)
- Further details of the EIS requirement can be found in OP section 4.7.8 or the EIS guidelines: https://documents.ottawa.ca/sites/documents/files/documents/eis_guidelines2015_en.pdf
- Furthermore, the subject property has been identified as a high recharge area according to the Carp Road Community Design Plan. As such, the environmental policies of the CDP require a groundwater impact study to be completed. https://documents.ottawa.ca/sites/documents/files/documents/con021202.pdf
- A tree conservation report (TCR) will also be required for this submission (OP 4.7.2). The City encourages as much tree retention as possible and tree compensation for trees removed. The TCR can be combined with the EIS to avoid duplications. Further details of the TCR requirements can be found in the TCR guidelines. https://ottawa.ca/en/living-ottawa/laws-licences-and-permits/laws/law-z/tree-protection-law-no-2020-340#schedule-tree-conservation-report-guidelines
- I would also encourage the applicant to consult with the MVCA to determine if any permits or approvals are required under their regulations.

Conservation Authority (MCVA)

Environmental Planning (Provided by Erica Ogden)

- The watercourse on the property is regulated by the Mississippi Valley Conservation Authority (MVCA) under Ontario Regulation 153/06, *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. Under Ontario Regulation 153/06, written permission is required from the MVCA prior to the initiation of development (which includes construction, site grading and the placement or removal of fill) within an area regulated by the Conservation Authority as well as straightening, changing, diverting or interfering in any way with the existing channel or the shoreline of a watercourse.
- MVCA has issued a permit (W19/283, expiry February 5, 2022) for the watercourse realignment along Russ Bradley Road. With the permit a development setback was established from the realigned watercourse. The crossing location for access to Russ Bradley Road was also established. Should any further alteration to the watercourse be required (e.g. culvert installation, stormwater outlet), an additional permit from the Conservation Authority would be required.
- The development setbacks from the watercourse must be met and the plantings required through the watercourse realignment maintained.
- A stormwater management report will be required with the site plan submission:
    - The water quality requirement is a enhanced level of protection, 80 % total suspended solids removal

- The property is within the Carp River Watershed Subwatershed Study area which has annual infiltration targets as outlined below. Existing infiltration rates on site should be assessed and maintained post development.
    - High groundwater recharge area 262mm/year infiltration

Application Submission Information

Application Type**: Site Plan Control, (type of application to be confirmed prior application submission)**

For more information on the Official Plan designation, please visit: https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-3-designations-and-land-use#3-7-5-rural-employment-area

For more information and related Zoning By-law provisions, please visit: https://ottawa.ca/en/zoning-law-no-2008-250/zoning-law-2008-250-consolidation#pdf-version

For information on Site Plan Control Applications, including fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor.

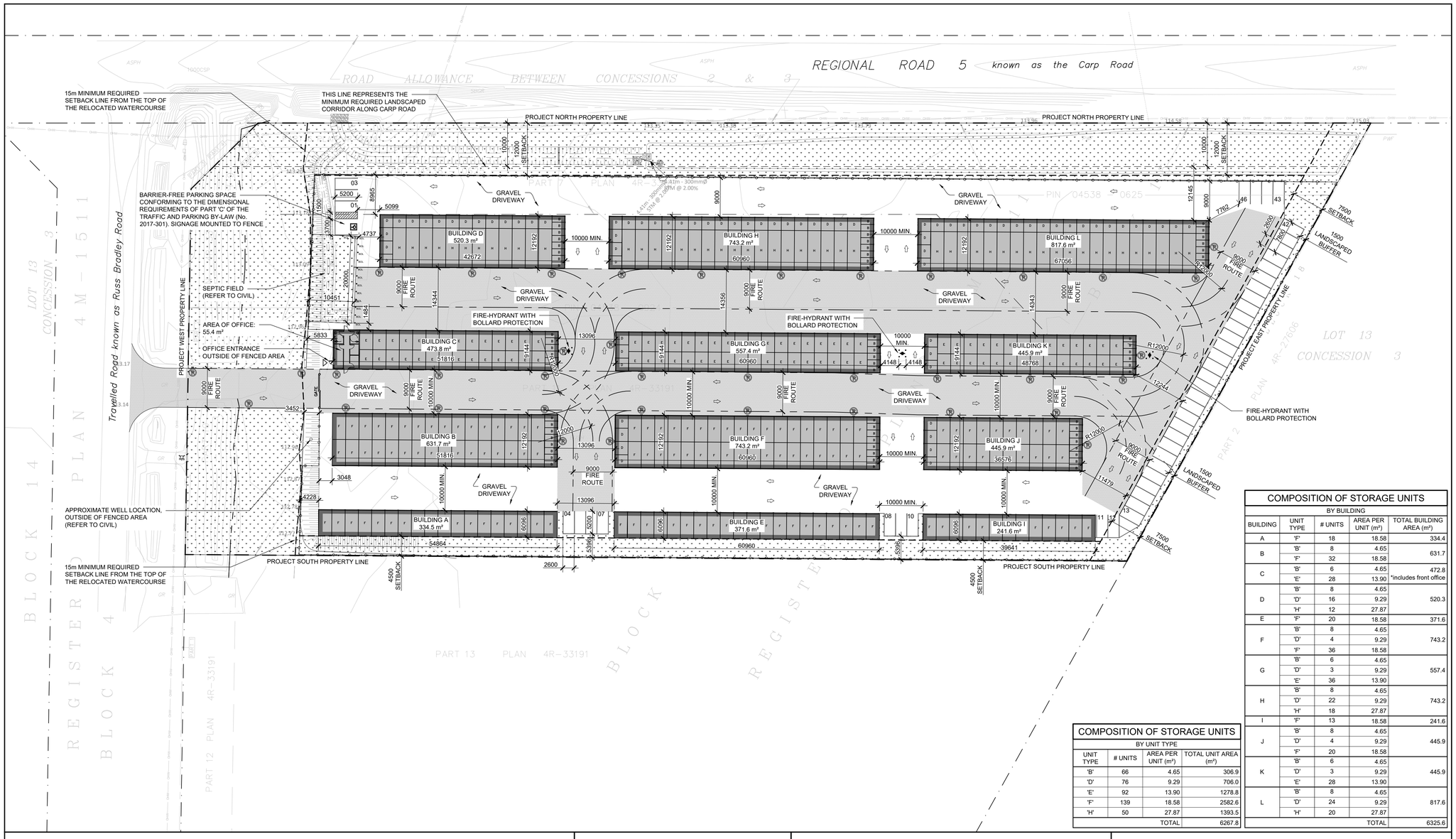
Application Submission Requirements

For information on the preparation of Studies and Plans and the City's requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Please provide electronic copy (PDF) of all plans and studies required.

All plans and drawings must be produced on A1-sized paper and folded to 21.6 cm x 27.9 cm (8½"x 11").

Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.



COMPOSITION OF STORAGE UNITS

BY BUILDING

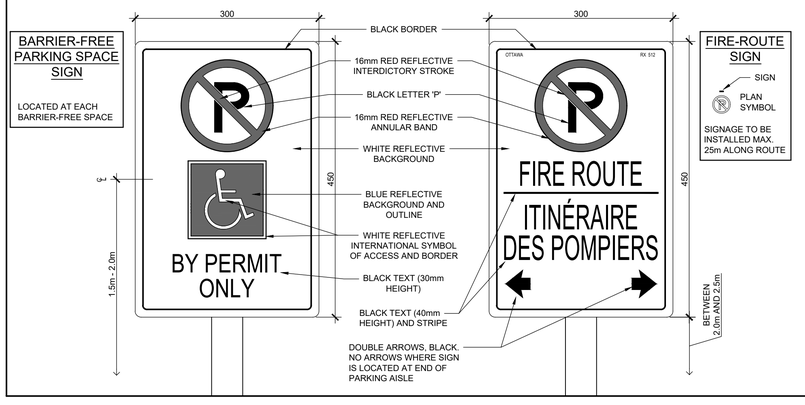
BUILDING	UNIT TYPE	# UNITS	AREA PER UNIT (m²)	TOTAL BUILDING AREA (m²)
A	'F'	18	18.58	334.4
B	'B'	8	4.65	631.7
	'F'	32	18.58	
C	'B'	6	4.65	472.8
	'E'	28	13.90	*includes front office
D	'B'	8	4.65	520.3
	'D'	16	9.29	
	'H'	12	27.87	
E	'F'	20	18.58	371.6
F	'B'	8	4.65	743.2
	'D'	4	9.29	
	'F'	36	18.58	
G	'B'	6	4.65	557.4
	'D'	3	9.29	
	'E'	36	13.90	
H	'B'	8	4.65	743.2
	'D'	22	9.29	
	'H'	18	27.87	
I	'F'	13	18.58	241.6
J	'B'	8	4.65	445.9
	'D'	4	9.29	
	'F'	20	18.58	
K	'B'	6	4.65	445.9
	'D'	3	9.29	
	'E'	28	13.90	
L	'B'	8	4.65	817.6
	'D'	24	9.29	
	'H'	20	27.87	
			TOTAL	6325.6

COMPOSITION OF STORAGE UNITS

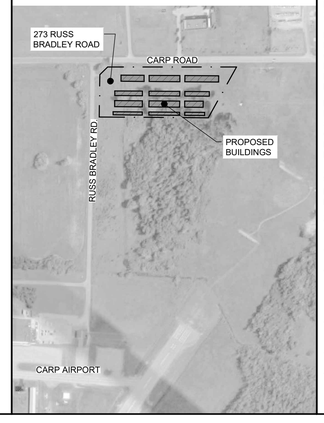
BY UNIT TYPE

UNIT TYPE	# UNITS	AREA PER UNIT (m²)	TOTAL UNIT AREA (m²)
'B'	66	4.65	306.9
'D'	76	9.29	706.0
'E'	92	13.90	1278.8
'F'	139	18.58	2582.6
'H'	50	27.87	1393.5
		TOTAL	6267.8

VERTICAL PARKING LOT SIGNAGE (POST OR WALL MOUNTED)



LOCATION KEY



ZONING INFORMATION

PER THE CITY OF OTTAWA ZONING BY-LAW 2008-250 CONSOLIDATION

LEGAL DESCRIPTION:
PORTIONS OF PARCEL 04538-0625, PARCEL 04538-0924 AND ABUTTING LANDS
PARTS 6 THROUGH 11, PLAN 4R-33191 BEING PART OF BLOCKS 15 AND 16, REGISTERED PLAN 4M-1511, CITY OF OTTAWA

PROPOSAL:
NEW GROSS 6,326 m² [68,093 ft²] SINGLE STOREY SELF STORAGE UNITS OVER 12 BUILDINGS. AN OFFICE, UTILITIES ROOM, AND WASHROOMS WILL BE PROVIDED IN THE BUILDING NEAREST THE MAIN DRIVEWAY ACCESS.

ZONING:

DESIGNATION: (T1B) AIR TRANSPORTATION FACILITY SUBZONE (PART 12)

ZONING PROVISIONS (PER TABLES 207 & 208):
- LOT AREA (MIN.) = NO MINIMUM
  ACTUAL LOT AREA = 24,247 m²
- LOT FRONTAGE (MIN.) = NO MINIMUM
  ACTUAL FRONTAGE = 99.1 m
- SETBACKS (MIN.):
  - FRONT = 12.0 m
  - CORNER SIDE = 12.0 m
  - INTERIOR SIDE = 4.5 m
  - REAR = 7.5 m
- MINIMUM SETBACK FROM WATERCOURSE:
  - 15.0 m FROM THE TOP OF BANK, PER SCHEDULE H OF SUBDIVISION AGREEMENT
- MINIMUM LANDSCAPED BUFFER ABUTTING CARP ROAD = 10.0 m
- MIN. % OF PARKING PROVIDED AS LANDSCAPED AREA = 15% MIN.
  - REQUIRED: = 93.15 m²
  - ACTUAL: = 6,140.4 m²
- LOT COVERAGE = 50% MAX.
  ACTUAL LOT COVERAGE = 26.1 %
- MAX. BUILDING HEIGHT:
  DETERMINED BY TRANSPORT CANADA

LOADING REQUIREMENTS:
(PER TABLE 113A UNDER PART 4)

BASED ON THE GROSS FLOOR AREA OF THE BUILDING, A MINIMUM OF 1 STANDARD PLUS 1 OVERSIZED LOADING SPACES ARE REQUIRED.

PARKING:
(PER TABLE 101 UNDER PART 4)

ROW N95 - WAREHOUSE REQUIRES 0.8 PARKING SPACES PER 100m² OF GROSS FLOOR AREA FOR THE FIRST 5,000 m², AFTER-WHICH 0.4 PARKING SPACES ARE REQUIRED PER 100m² BEYOND 5,000m² OF GROSS FLOOR AREA. PARKING SPACES UNDER THIS SECTION RECOGNIZE ONLY THOSE WHICH ARE WITHIN THE PROPERTY BOUNDARY.

REQUIRED: 46 SPACES
PROVIDED: 46 SPACES

BARRIER-FREE PARKING:
(PER SECTION 111 UNDER PART C OF BY-LAW No. 2017-301)

RESERVED BARRIER-FREE PARKING SPACES:
REQUIRED: 1 SPACES
PROVIDED: 1 SPACES

SITE PLAN LEGEND

- PROPERTY LINE
- PROPERTY MARKERS
- SETBACK LINE
- FIRE ROUTE LINES
- NEIGHBOURING PROPERTY LINES
- FENCELINES
- CARP — STREETNAME AND CENTRELINE
- BARRIER-FREE CURB RAMP w/ TACTILE ATTENTION INDICATORS
- EXISTING BUILDINGS/ STRUCTURES
- EXTENTS OF PROPOSED BUILDING(S)
- LANDSCAPED AREA (REFER TO LANDSCAPE DRAWINGS)
- HEAVY DUTY SURFACING (REFER TO CIVIL)
- SW — CONCRETE SIDEWALK
- APPROXIMATE LOCATION AND CROWN OF NEW AND EXISTING TREES (REFER TO CIVIL DRAWINGS FOR SPECIES)
- PRINCIPAL ENTRANCES
- EMERGENCY EXITS
- SECONDARY ACCESS DOORS AND/OR OVERHEAD DOORS (O/H)
- FIRE-HYDRANT (REFER TO CIVIL)
- CB — NEW CATCH BASIN (REFER TO CIVIL)
- TRAFFIC FLOW
- EXTERIOR WALL MOUNTED LIGHT PACKS (REFER TO ARCHITECTURAL ELEVATIONS AND ELECTRICAL ENGINEER'S DRAWINGS)
- BOL — CONCRETE-FILLED PAINTED METAL BOLLARD
- FIRE ROUTE/NO PARKING SIGNAGE - INSTALLED MAX. 25m ALONG ROUTE (SEE DETAIL THIS SHEET)

01 SP-A01 PROPOSED SITE PLAN
SCALE: 1:500

DEIMLING
ARCHITECTURE & INTERIOR DESIGN

THIS SITE PLAN HAS BEEN BASED ON THE SURVEYOR'S TOPOGRAPHY SKETCH PREPARED BY MCINTOSH PERRY SURVEYING INC., DATED OCTOBER 26th, 2021.

True North | Project North

Revisions

No.	By	Description	Date
05	JF	ISSUED FOR SITE PLAN CONTROL	16 DEC 2022
04	JF	ISSUED FOR COORDINATION	13 DEC 2022
03	JF	ISSUED FOR COORDINATION	27 SEP 2022
02	JF	ISSUED FOR REVIEW	17 JUN 2022
01	JF	ISSUED FOR CLIENT REVIEW	11 JAN 2022

Project
SELF STORAGE SITE PLAN REVIEW

273 & 275 RUSS BRADLEY RD., CARP, ON

Drawing
PROPOSED SITE PLAN

Scale: AS NOTED
Drawn: J.F.
Checked: J.F. / C.D.

Stamp: ONTARIO ASSOCIATION OF ARCHITECTS — CHRISTOPHER LEE DEIMLING LICENCE 6238

Project No.: 21-170
Date: DECEMBER 2021

Drawing No.: SP-A01

WEST CAPITAL AIRPARK
(Carp Airport)
1500 Thomas Argue Road
City of Ottawa

HYDRAULIC NETWORK ANALYSIS

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

November 2011
Revised: May 28, 2013
Revised: September 26, 2013
Revised: November 5, 2014
Novatech File: 102085
Ref: R-2014-172

NOVATECH
Engineers, Planners & Landscape Architects

November 5, 2014

City of Ottawa
Planning & Growth Management Department
110 Laurier Avenue West
4th Floor Infrastructure Approvals Division
Ottawa, ON K1P 1J1

Attention: Kevin Hall, C.E.T., Project Manager

Dear Sir:

Re: West Capital Airpark
Hydraulic Network Analysis
Novatech File No.: 102085
City of Ottawa File No.: D07-16-10-0016

Please find enclosed four (4) copies of the report entitled, "West Capital Airpark - Hydraulic Network Analysis" revised November 2014. This report has been revised with additional Modelling Scenarios 6 & 7 to confirm adequate capacity of standalone Phase 1 Residential Hydraulic Network.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Carl Sciuk, P. Eng.
Senior Project Manager

cc: City of Ottawa – Fire Services
West Capital Developments

M:\2014\102085\DATA\REPORTS\WATER DISTRIBUTION\OCTOBER 2014\20141105 HYDRAULIC NETWORK ANALYSIS.DOC

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APPENDICES

DRAWINGS

Overall Watermain Layout Plan	102085-WMOL, revision 8
Plan & Profile Drawings Carp Road	102085-P65 to 102085-P68, all revision 6
Watermain Details Plan	102085-D7, revision 6
Water Storage Facility Process (Schematic)	102085-W1, revision 3
Water Storage Facility Pump Room (Sections)	102085-W1.1, revision 3

1.0 INTRODUCTION

The proposed West Capital Airpark is located approximately 2km south of the Village of Carp as shown on **Figure 1** (Key Plan). A private communal water distribution network is proposed which will be connected to the existing Village of Carp municipal water distribution network. The proposed private communal water distribution network will form part of a common elements condominium that will be established for this development. The common elements condominium will own, operate and maintain the water system which will service a mixture of single family homes, townhomes, communal hangers and Aerospace Business Park as shown on **Figure 2** (Land Use Plan).

The subdivision has been draft approved. Draft conditions are included in **Appendix A** for reference.

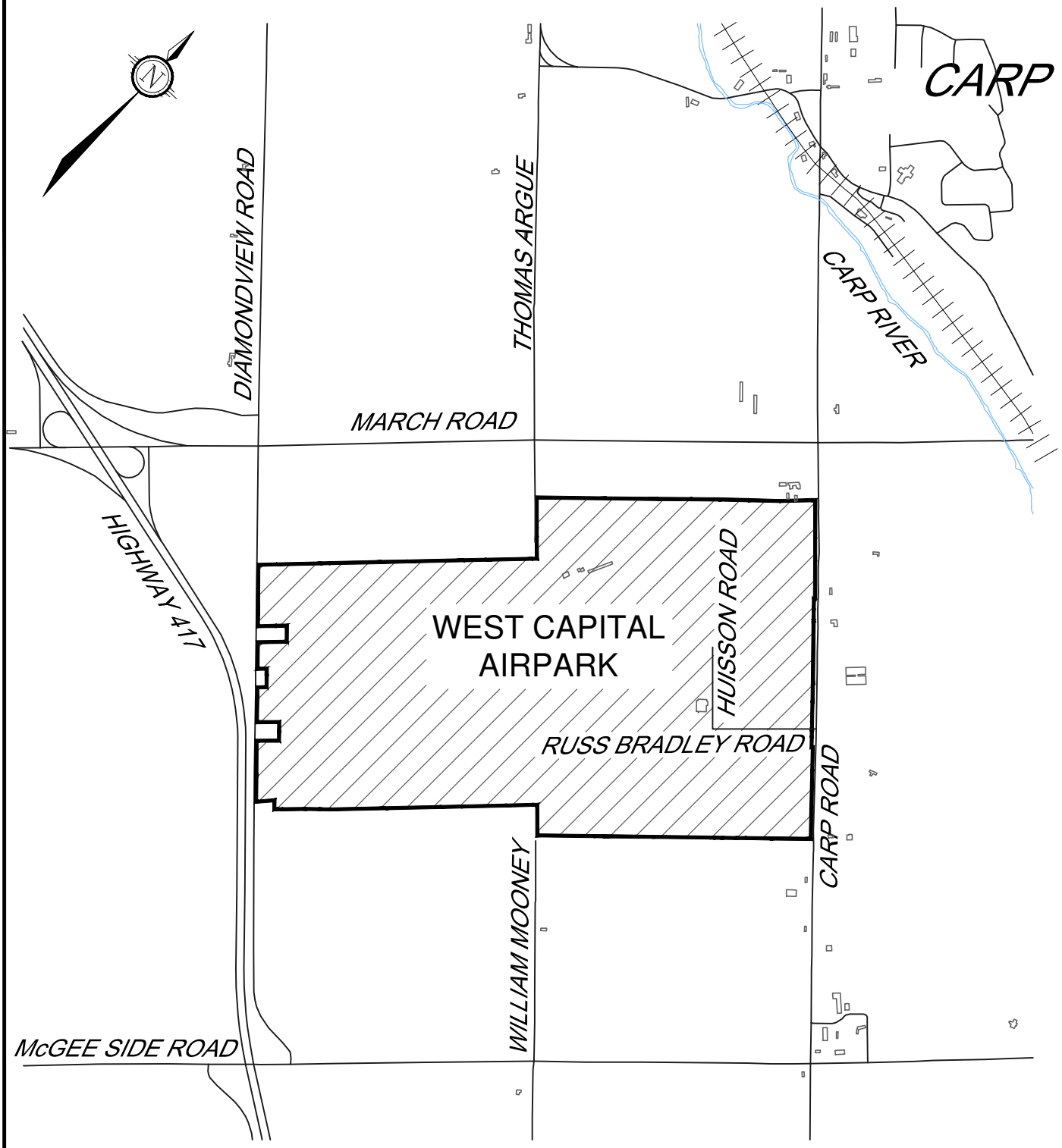
The proposed private communal water distribution includes a feeder main from Carp, a water storage facility and water distribution network. The existing Village of Carp distribution system will supply the water storage facility with maximum day demand. The City of Ottawa has committed to supplying Phase 1 Maximum Day water demand to the West Capital Airpark by utilizing existing reserve capacity. The City of Ottawa has stated that future phase water supply requirements will be provided by expanding reserve capacity through upgrades of the existing water supply system as per the Village of Carp Class Environmental Assessment (May 2008).

The proposed West Capital Airpark Water Storage Facility will monitor water quality parameters and boost chlorine levels if required to ensure drinking water is potable prior to local distribution. Domestic peak hour water requirements and fire flow will be provided to the Airpark via the water storage facility. This report has been produced to provide the basis for detailed design of the proposed private communal water distribution network, and addresses questions received from the City of Ottawa.

2.0 BACKGROUND

The West Capital Airpark completed an Environmental Assessment Report[1] for the proposed project in 2007 which determined that water supply from the Village of Carp was the preferred alternative. Subsequently, the Carp Environmental Assessment[2] for water upgrades within Carp incorporated the maximum day allocation of 1.46ML/day for the airport. The City has agreed that a Phase 1 maximum day allocation of 0.52ML/d will be provided to the airport without triggering any upgrades within Carp. The water supply beyond Phase 1 maximum day allocation will require upgrades of the Carp water supply system, as described in the Carp EA. The maximum day allocation for Phase 1 has not increased, but the mix of development has been modified as follows:

[1] Carp Airport Water & Sanitary Alternatives Evaluation Report, Novatech, April 2007
[2] Village of Carp Class EA for Water and Wastewater Infrastructure Upgrade/Expansion, Stantec, May 2008



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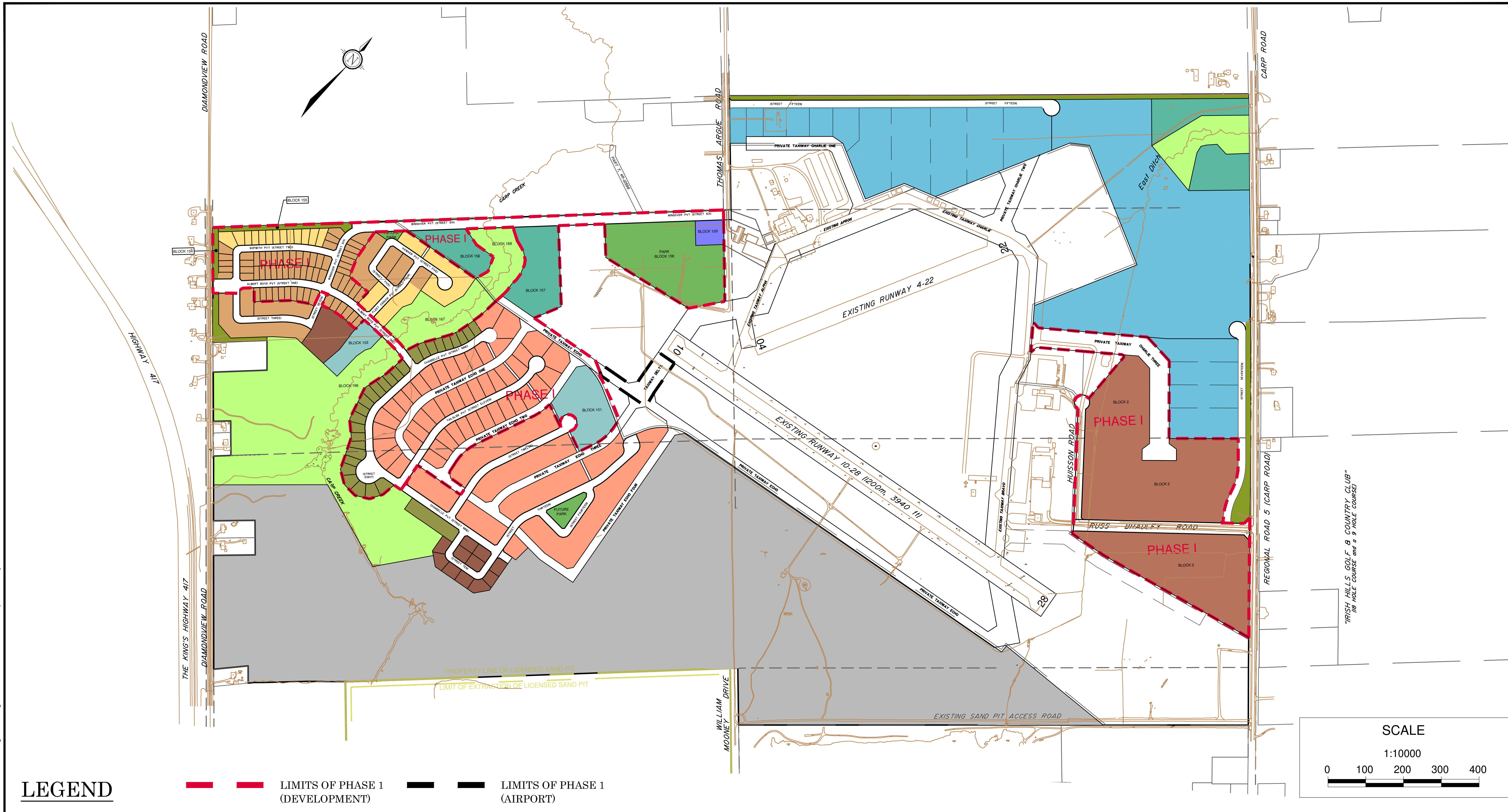
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA

WEST CAPITAL AIRPARK

KEY PLAN

NOV 2014 102085 FIGURE 1



LEGEND

- LIMITS OF PHASE 1 (DEVELOPMENT)
- LIMITS OF PHASE 1 (AIRPORT)
- SINGLES 50' (15.2m) WIDE PHASE 1 LOTS: 64
- SINGLES 60' (18.3m) WIDE PHASE 1 LOTS: 13
- SINGLES 70' (21.3m) WIDE PHASE 1 LOTS: 28
- HANGAR ESTATE LOTS 30m PHASE 1 LOTS: 46
- TOWN HOMES (9.0m WIDTH) PHASE 1 UNITS: 0
- AEROSPACE BUSINESS PARK - PHASE 1
- AEROSPACE BUSINESS PARK - FUTURE PHASE
- COMMUNAL HANGARS / CLUBHOUSE
- SWM FACILITY AREA
- CORE AIRPORT AREA
- ADDITIONAL LANDS OWNED BY WEST CAPITAL DEVELOPMENTS
- OPEN SPACE (TO BE DEDICATED TO CITY)
- PARKLAND (TO BE DEDICATED TO CITY)
- LANDSCAPE BUFFER

PHASE 1 LOTS / UNITS: 151

TOTAL LOTS / UNITS: 329

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Facsimile (613) 254-5867
Website www.novatech-eng.com

WEST CAPITAL AIRPARK

LAND USE PLAN

NOV 2014 102085 FIGURE 2

Original Initial Phase	Revised Initial Phase
110 Residential Units	151 Residential Units
200,000ft^2 serviced business park	0 ft^2 serviced business park [private wells]
Max Day = 0.52ML/day	Max Day = 0.47ML/day

The water distribution network will be a private, condominium owned communal system under the jurisdiction of the SDWA. Correspondence to the City[3] (October 28, 2011 and March 8, 2012) summarizing the design standards being used and the responsibility for review is included in **Appendix B**.

3.0 DOMESTIC WATER SUPPLY

The West Capital Airpark will be proactive in water conservation measures and anticipate that maximum day water demand will be considerably less than City of Ottawa Design Guidelines demand estimates. However, the City of Ottawa Design Guidelines have been used in this EPANET analysis in order to conservatively validate the operation of the water distribution network. **Table 1** indicates the phased demand.

The City of Ottawa has stated that the water supply in the private distribution network must be deemed non potable until it is tested for residuals at the water storage facility. The watermain from Carp will fill reservoirs at the water storage facility prior to distribution to any potable water users.

A 150mm watermain will supply potable water from the water storage facility back to the business park area. The 150mm watermain will be constructed in Phase 1, but not commissioned until later phases when the business park is developed. The area serviced by this 150mm watermain is indicated on **the** Overall Watermain Layout Plan **(102085-WMOL**) and **Table 1**.

[3] Novatech letter dated October 28, 2011, Appendix B
[3] Novatech memo dated March 8, 2012, Appendix B

TABLE 1:
PHASED WATER DEMAND

Proposed Use	Phase 1	Future	Ultimate	
Residential				
Single Units	151	138	289	
Capita/Single Unit	3.4	3.4	3.4	
Townhome Units	0	41	41	
Capita/Townhome Unit	2.7	2.7	2.7	
Population	510	580	1090	
Average Flow/Capita	350 L/d	350 L/d	350 L/d	
Average Day Flow	179,690 L/d	202,965 L/d	382,655 L/d	
Maximum Day Flow	449,225 L/d	507,413 L/d	956,638 L/d	*2.5 x Avg Day*
Peak Hour Flow	11.4 L/s	12.9 L/s	24.4 L/s	*2.2 x Max Day*
Non Residential				
Community Center		11,615 L/d	11,615 L/d	
Communal Hanger	900 L/d		900 L/d	
City Park	1,200 L/d		1,200 L/d	
Sewage Treat. Plant	200 L/d		200 L/d	
Average Day Flow	2,300 L/d	11,615 L/d	13,915 L/d	
Maximum Day Flow	3,450 L/d	17,423 L/d	20,873 L/d	*1.5 x Avg Day*
Peak Hour Flow	0.1 L/s	0.4 L/s	0.4 L/s	*1.8 x Max Day*
Business Park				
Cumulative Land Area		18.6 Ha	18.6 Ha	
Building Floor Area		800,000 sq.ft	800,000 sq.ft	
Average Flow/ha		35,000 L/d	35,000 L/d	
Average Day Flow		651,000 L/d	651,000 L/d	
Max Day Flow		976,500 L/d	976,500 L/d	*1.5 x Avg Day*
Peak Hour Flow		20.3 L/s	20.3 L/s	*1.8 x Max Day*
Total Average Flow	189,990 L/d	865,580 L/d	1,047,570 L/d	
Total Max Day Flow	452,675 L/d	1,501,335 L/d	1,954,010 L/d	
Total Max Day Flow	5.2 L/s	17.4 L/s	22.6 L/s	
Total Max Day + Fire	68.3 L/s	80.5 L/s	85.7 L/s	*Fire Flow=63.08L/s*
Total Peak Hour	11.5 L/s	33.6 L/s	45.1 L/s	

4.0 FIRE FLOWS

Novatech met with the City of Ottawa Fire Services on April 20, 2011[4] to discuss the West Capital Airport fire protection requirements. Fire flow will be provided to the residential area, service business park and unserviced business park. Novatech presented the concept plan and discussed the tradeoffs between higher fire flows and water quality due to the extensive water distribution network compared with modest water demand. The City of Ottawa Fire Services reviewed the site plan and suggested the following:

1) A fire flow of 63.08L/s for 30 minutes was acceptable for all areas of the development. This reflects the standard for rural fire fighting in the area and the city can supplement flows with rural fire shuttle capabilities.
2) All fire hydrants should be fully charged so that when fire fighters arrive they can hook up and start fighting the fire without the need to open valves etc. This necessitates a backflow preventer chamber for unserviced Business Park area because there is no domestic consumption and lines may stagnate.
3) Fire hydrants are not required on hanger lot taxiways.

The occupancy and nature of buildings within the business park is unknown at this time. Should a future occupancy require additional fire fighting capability, it can be provided by installation of onsite fire tanks and dry hydrants by the future occupant.

5.0 HYDRAULIC MODELLING

EPANET 2.0 was used to model the hydraulic network using the following design parameters:

System Requirements:

- Maximum Pressure Unserviced 690 Kpa (100 psi)
- Maximum Pressure Serviced Areas 552 Kpa (80psi)
- Minimum Pressure 275 Kpa (40 psi)
- Minimum Pressure (fire) 140 Kpa (20 psi)

Friction Factors:

Watermain Size		C-Factor
100/150	mm diameter	100
200/250	mm diameter	110
300	mm diameter	120

Water Supply Pressure

Peak Hour total hydraulic head is 156m at corner of Rivington St. and Carp Road[5]. Actual pressure under lower flows will be between 161m & 156m, however 156m was modelled as a conservative assumption. (No high pressure condition will exist with 161m pressure supply).

[4] Email dated April 20, 2011, Appendix B
[5] Email from City of Ottawa, Appendix B

5.1 EPANET Modelling Scenarios

5.1.1 Water Storage Facility Reservoir Filling

The existing Village of Carp Water Distribution Network will provide the potable water to fill the reservoir at the West Capital Airpark Water Storage Facility. The watermain from Carp to the reservoir needs to be capable of supplying maximum day flow for the all phases of the development. The distribution network from Carp to the storage facility was modelled at various flow rates in order to develop a system curve and validate that the reservoir can be filled at maximum day demand rate. Refer to Plan & Profile Drawings Carp Road **(102085-65 to 102085-68)** for location of watermain along Carp Road.

5.1.2 Maximum Day Plus Fire Flow to Residential

The West Capital Airpark Water Storage Facility will supply, peak hour, maximum day domestic demand and fire flow to the downstream residential area. Maximum day plus fire was determined to be the critical criteria for watermain sizing. The distribution network from the water storage facility to the residential area was modelled with Phase 2 maximum day demand plus fire flow [63.1L/s] at various nodes to validate the sizing of the distribution network.

5.1.3 Fire Flow to Business Park

The water distribution network between Carp and the water storage facility will provide fire flow to Business Park area. During a fire, the water pressure in the Business Park area upstream of the water storage facility will drop. The water storage facility will detect this pressure drop, close the reservoir fill valve and provide fire flows as required. The furthest hydrant in the Business Park area was modelled to validate capability of the water storage facility to meet fire demands [63.1L/s].

5.1.4 Peak Hour Flow to Residential and Business Park Area.

The water supply from Carp will be deemed non potable until tested at the water storage facility. The residential area and northern Business Park area domestic demand will therefore need to be supplied from the water storage facility. A 150mm watermain between the water storage facility and the northern Business Park area will be required to convey potable water. The 150mm watermain will only need to convey domestic demand and therefore will be sized to meet peak hour flows. Peak hour flows were modelled to determine the required watermain sizing and assist with pump selection criteria.

5.1.5 Phase 1 Water Age

The water distribution network was modelled simulating demand during the early stages of the Airpark to determine water age throughout the distribution network. Water age simulations were performed separately for:

a) Water supply from Carp to the storage facility. Water supply from Carp to the facility was be modelled for various flow rates to approximate the age of potable water as it enters the water storage facility. The water storage facility will test, rechlorinate and recirculate potable water within the storage facility if necessary prior to distribution.

b) Water supply from the storage facility to Phase 1 residential area. Early stages of Phase 1 were modelled to approximate minimum flow rates which will be required to maintain water quality.

5.1.6 Residential Phase 1 - Peak Hour

The water distribution network was modelled simulating demand during Phase 1 of the Airpark to determine if Phase 1 piping alone has adequate capacity to deliver peak hour flows.

5.1.7 Residential Phase 1 - Maximum Day plus Fire

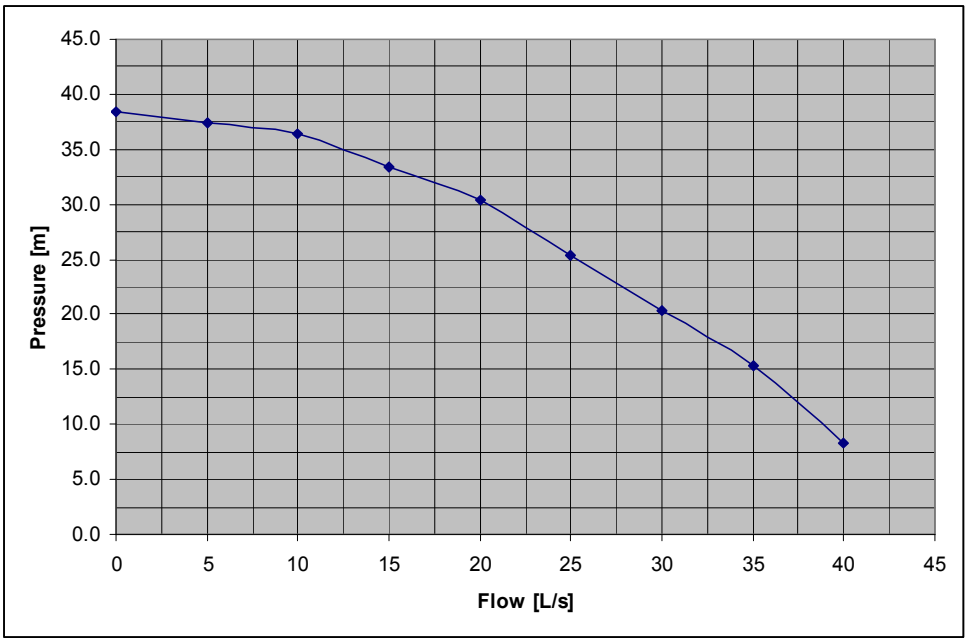
The water distribution network was modelled simulating fire flow when only Phase 1 infrastructure is in place to determine if there is adequate fire flow capacity within Phase 1.

5.2 Results

5.2.1 Water Storage Reservoir Filling

A 200mm watermain is required on Carp Road to allow the storage reservoir to be filled at a maximum day flow rate of 22.6L/s while maintaining a minimum pressure of 27.5m in the distribution system. Ultimately, the reservoir can be filled at a rate of up to 35L/s with a minimum pressure of 14m. **Figure 3** shows the results of EPANET simulations for various fill rates and resultant residual pressure.

FIGURE 3:
RESERVOIR FILL RATE vs RESIDUAL PRESSURE



5.2.2 Maximum Day + Fire Flow

Watermain sizes downstream of the water storage facility were developed through several iterations with fire demand simulated at different node locations throughout the residential area. The following summarizes the results of these modelling iterations:

- A 300mm Watermain is required to convey fire flows from the water storage facility to the residential distribution grid.
- Watermains conveying fire flows within residential area are 200/150mm diameter.
- 50mm watermains are adequate at cul de sacs which do not convey fire flows.
- The HGL at water pump station needs to be 159m to provide the required fire flow

The Overall Watermain Layout Plan, 102085-WMOL, reflects the required watermain sizing. Details of the EPANET modelling run results can be found in **Appendix C**.

5.2.3 Fire Flow to Business Park Area

The proposed 300mm watermain network will be adequate to provide 63.09L/s to the Business Park area. Modelling results can be found in **Appendix C**.

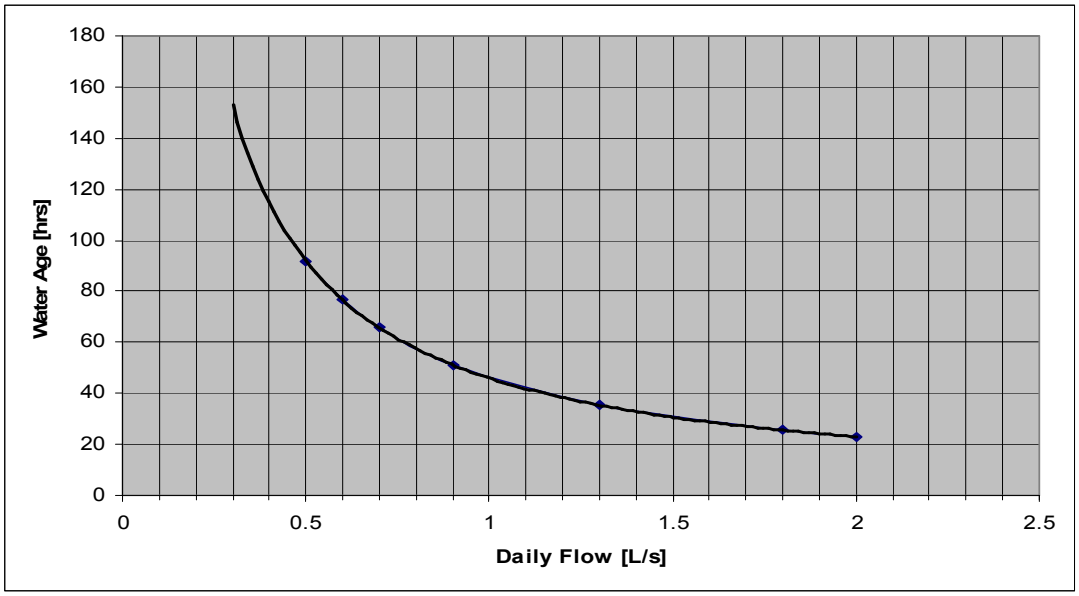
5.2.4 Peak Hour Flow to Residential and Business Park Area

Table A-5 from **Appendix C** shows the calculated peak hour pressures at each node. The maximum pressure difference in serviced areas is 4.62psi [Nodes KK & UU]. The pump station will need to operate between a HGL of 148m & 165m. This translates to a pump head of approximately 36m [peak hour flow with 3m tank head] and 53m [zero flow with 9m tank head]. The private system can therefore operate within requirements specified in Section 5.0 and no pressure reducing valves (PRV) will be required.

5.2.5 Phase 1 Water Age

a) **Figure 4** shows the results of modelling water age in the watermain from the meter chamber in Carp to the storage facility during various average day flow demands. A minimum daily consumption of ~0.3L/s is estimated to be required in order to meet a target age of 7 days [168hours]. This translates to the average consumption of 22 homes. Once the water supply reaches the water storage facility, it will be tested for turbidity and chlorine levels and chlorine levels will be elevated if required.

FIGURE 4:
WATERMAIN AGE vs FLOW



b) The modelling results indicate that some water flushing will be required at remote sections of the water distribution network in the early stages of Phase 1. The flushing rate required will depend on the number of homes in service, but when 20 homes are in service [1,1666L/day/home] a bleed rate of 0.1L/s [8.6m^3/day] will be required to keep water age below 4 days. A bleed rate of approximately 0.3L/s will be required if consumption per home is 540L/day. The actual flushing rate is expected to be lower than 0.1L/s should a water age of up to 7 days be acceptable. The water bleeding will be installed near Node Z and will consist of a external flushing unit with air gap to sanitary drain. The bleed rate can be tested at any time by inserting a 1L container in the flowpath and recording the amount of time it takes to fill. Please refer to **Appendix C** for EPANET modelling details.

5.2.6 Residential Phase 1 - Peak Hour

Table A-7 from **Appendix C** shows the calculated peak hour pressures at each node. The minimum pressure in serviced areas is above 40psi.

5.2.7 Residential Phase 1 - Maximum Day plus Fire

Table A-8 from **Appendix C** shows the calculated maximum day plus fire pressures at each node. The minimum pressure in serviced are above 20psi.

5.3 Water Storage Facility

The proposed water storage facility will include two at grade reservoirs, water quality monitoring, chlorine boosting station and high lift pumps as indicated on Water Storage Facility Process drawing **(102085-W1)**. The proposed water reservoir will be phased with Reservoir #1 commissioned in Phase 1 and Reservoir #2, which will be commissioned when maximum day demands exceed 446m^3/day. High lift pumps will be sized to meet peak hour and fire flow demands. Drawings of the water storage facility and typical above grade tank are included in this report.

Table 2 shows the required storage volumes based on a fire flow of 63.08L/s for 30minutes and M.O.E. criteria:

TABLE 2:

WATER STORAGE REQUIREMENTS

Item	Phase 1		Total All Phases	
Fire Flow	63.09	L/s	63.09	L/s
Fire Duration	0.5	Hrs	0.5	Hrs
Fire Storage	113,562	L	113,562	L
Equalization Storage[25%MaxDay]	108,075	L	360,700	L
Emergency Storage = 25% x [Fire Storage + Max Day storage]	55,409	L	118,566	L
Total Storage	277,046	L	592,828	L

6.0 METER CHAMBER AT CARP

The transition from City of Ottawa watermain to private communal distribution network will occur just downstream of the isolation valve near the connection point in Carp as shown on Drawings **102085-P65** and **102085-D7**. The metering chamber will include a flow meter and backflow preventer to protect the City of Ottawa distribution network from any potential downstream contamination. The proposed meter and backflow preventers are sized for maximum day demand. The City of Ottawa flow meter, will include an above grade remote panel to allow downloading of meter readings. The meter chamber includes a bypass which allows circumvention of the flow meter and is normally closed. Details of the proposed meter, backflow preventer and metering chamber can be found in the water distribution drawings **(102085-W1, 102085-W1.1)** and product data sheets **(Appendix D)** included in this report.

7.0 CONCLUSIONS

The proposed private communal water distribution infrastructure for the West Capital Airpark has been designed to meet domestic demand and fire flow conditions. The private communal water distribution system will form part of a common elements condominium that will be established for this development. The common elements condominium will own, operate and maintain the water system. The meter chamber near the connection point at Carp will monitor water consumption for billing purposes. All downstream components will be operated and maintained by common elements condominium. The proposed private communal water distribution infrastructure includes:

- A meter chamber and backflow preventer at the connection point in Carp to meter water usage.
- A 200mm private communal watermain from existing distribution network at Carp Road and Rivington Street running along the shoulder of Carp Road.
- A private communal Water Storage Facility with rechlorination and high lift pumping, and two at grade Storage Reservoirs.
- A private communal watermain network to service residential and Business Park areas.
- A private communal water flushing station located at Phase 1 residential area to ensure water quality during early stage of the development when there may be low potable water consumption.
- Phase 1 infrastructure is adequate to meet peak hour and fire flow requirements with no further infrastructure in place.

Prepared by:

NOVATECH

Carl Sciuk, P. Eng.
Senior Project Manager

Appendix A

Draft Conditions

RECEIVED MAY 2 9 2014

File No.: D07-16-13-0012

May 26, 2014

Adam Thompson
Novatech Engineering Consultants Ltd.
240 Michael Cowpland Dr. Suite 200
Ottawa ON K2M 1P6

Dear Mr. Thompson:

RE: 1500 Thomas Argue Road
West Capital Developments
Draft Plan of Subdivision (Parent File # D07-16-05-0035)
City of Ottawa

Further to our letter dated November 1, 2013, please be advised that the City's draft approval for the West Capital Developments, Carp Airport Subdivision at 1500 Thomas Argue Road, which would have lapsed on May 31, 2014, has been extended to November 16, 2016.

If a further extension to the City's draft approval is required, it is your responsibility to advise the Planning and Growth Management Department of your interest, complete the City's application form and satisfy all of the submission requirements for a further extension. **Please note that the City cannot extend draft approval if the draft approval period has lapsed.**

A copy of the conditions is attached for your information.

By copy of this letter and the draft approval conditions, the City is notifying those public bodies and agencies who requested draft approval conditions that the draft approval conditions associated with Draft Plan of Subdivision (File No. D07-16-13-0012) have been revised. You should contact the relevant agencies to secure the clearance letters that will allow City staff to register one or more phases of the Draft Plan of Subdivision

When you are preparing to have the Draft 4-M Plan approved for registration, please provide me with electronic copies of the Draft 4-M Plan – PDF and AutoCAD versions, along with five white paper prints, which include the approved street names for all new roadways. Please also provide a completed "Proposed Land Use" table (attached) for the phases to be registered and a request to prepare a subdivision agreement. A copy of the document "Estimate of Costs" has also been provided for your review. Owners are required to pay engineering design, review and inspection fees, and submit securities, which are based upon the cost estimates of the hard and soft services related to their development. The "Estimate of Costs" provides information on how to submit the quantity estimates online and provides a list of the City's current costing. Quantity estimates are required to be submitted prior to the preparation of a subdivision agreement.

City of Ottawa
Planning Growth Management Department
110 Laurier Avenue West
Ottawa ON K1P 1J1
Tel : (613) 580-2400
Fax : (613) 580-2576
www.ottawa.ca

Ville d'Ottawa
Service de l'urbanisme et de la gestion de la croissance
110, avenue Laurier Ouest
Ottawa ON K1P 1J1
Tél : (613) 580-2400
Fac : (613) 580-2576
www.ottawa.ca

Attached for your information is a one-page summary of the information required to facilitate the completion of the subdivision agreement. If you would like to meet with representatives of either this Department or Legal Services to review or clarify these requirements, please contact the undersigned at 613-580-2424, extension 31329.

When the Final (4-M) Plan is being submitted for registration, please forward to me, the original mylar of this plan, three duplicates mylars and one white paper print with the surveyor's embossed decal. If the final plan complies with the draft approval conditions and the City of Ottawa has received assurances from the interested agencies that the necessary arrangements have been made to clear all the draft approval conditions, the Planning and Growth Management Department, General Manager's signature will be endorsed on the above-noted plans which will then be sent to the local Land Titles Registry for registration, along with the necessary copies required under the *Land Titles Act*. (Please note that it is the Owner's responsibility to secure the required clearances).

If you wish to make a major revision to this plan prior to registration, please submit a revised full size mylar, an 8.5" x 14" cronaflex reduction of same and twenty-five folded paper prints, the fee (if required) and a revised "Proposed Land Use Table" (attached).

Should Draft Plan **D07-16-13-0012** not receive final approval within three years of the date on which draft approval came into effect, the draft approval will lapse pursuant to Section 51(32) of the *Planning Act*. Draft approval may be extended by the City in accordance with Section 51(33) of the *Planning Act, 1990*, provided that the applicant applies for a further extension, as previously stated, prior to the lapsing date.

Yours truly,

Derrick Moodie
Manager, Development Review (Rural)
Planning and Growth Management

c.c.: Norma McConnell, City of Ottawa Legal Services Branch
Councillor Eli El Chantiry Ward Councillor
Gordon MacNair REPDO

File: D07-16-13-0012

CONDITIONS FOR FINAL APPROVAL
WEST CAPITAL DEVELOPMENTS
CARP AIRPORT SUBDIVISION

DRAFT APPROVED AUG 16, 2007
DRAFT APPROVAL EXTENDED FROM AUG. 16, 2010 TO NOV. 16, 2010
DRAFT APPROVAL EXTENDED FROM NOV. 16, 2010 TO NOV.16, 2013
DRAFT APPROVAL EXTENDED FROM NOV. 16, 2013 TO MAY 31, 2014
DRAFT APPROVAL EXTENDED FROM MAY 31, 2014 TO NOV. 16, 2016

The City of Ottawa's conditions applying to the approval of the final plan for registration of West Capital Developments Carp Airport Subdivision (File No. D07-16-13-0012) are as follows:

		Agency to Clear
	General	
1.	This approval applies to the draft plan certified by, David W. Woodland, Ontario Land Surveyor, dated December, 2005, revised March 2007 (Sheet 1 and 2) showing 270 single detached lots, 4 townhouse blocks, 3 park blocks, 4 stormwater pond blocks, 9 industrial blocks, 3 conservation blocks, walkways blocks, taxiway blocks, street blocks and blocks for general aviation airport.	
2.	The Owner agrees, by entering into subdivision agreements, to satisfy all requirements, financial and otherwise, of the City of Ottawa, including but not limited to, the provision of roads, installation of services and utilities, and drainage in accordance with City or Ministry of Environment Standards and Specifications all to the satisfaction of the City.	**OTTAWA (Planning)**
3.	Any residential blocks on the final plan shall be configured to ensure that there will generally be no more than 25 units per block.	**OTTAWA (Planning)**
4.	That the Owner acknowledges and agrees that all reports and/or studies required as a result of the approval of the Plan of Subdivision shall be implemented to the satisfaction of the City at the sole expense of the Owner. Further, that the City may require certification by the Owner's Professional consultants that the works have been designed and	**OTTAWA (Planning)**

constructed in accordance with the approved reports, studies, standards, specifications and plans to the satisfaction of the City.

5.	Upon approval of the Draft Plan of Subdivision by the City, municipal and private services within the Plan of Subdivision may be installed provided appropriate approvals have been provided financial security, insurance, and a letter of indemnity are posted to the satisfaction of the City.	**OTTAWA (Planning)**
6.	Prior to any further division of lots or blocks, the City of Ottawa may require an additional agreement to address any new or amended conditions.	**OTTAWA (Planning)**
7.	The Owner acknowledges and agrees that materials used for marketing purposes shall identify the locations of all applicable collector roads, collector roads designed to transit standards, walkways, parkland, and postal lay-bys. The owner further agrees to inform all prospective purchasers of the locations identified for potential community mailboxes and any associated lay-bys.	**OTTAWA (Planning)**
8.	The Owner must demonstrate through a detailed phasing plan that the ratio of four (4) units per Communal Hangar will be met. The development of the communal hangars are subject to Site Plan Approval.	**OTTAWA (Planning)**
9.	The Owner agrees that the final design of the communal hangar blocks may require more land in order to meet the 4:1 unit/hangar ratio. If the lands for the communal hangars need to be expanded the Owner agrees that additional lands will be provided within the development area as identified in the plan of subdivision to the satisfaction of the General Manager, Planning and Growth Management.	**OTTAWA (Planning)**
10.	The development of Block 278 (Clubhouse) and Blocks 271-274 (Townhouse Blocks) are subject to Site Plan Approval.	**OTTAWA (Planning)**
11.	The Owner shall install, to the Satisfaction of the General Manager, Planning and Growth Management, appropriate signage that will discourage the public from utilising pathways which are meant for the purpose of accessing the communal hangars.	**OTTAWA (Planning)**
12.	The Owner acknowledges that development of Block 273 will be subject to the completion of an aggregate impact study, demonstrating to the satisfaction of the Director of Planning and Infrastructure Approvals, that development of the proposed townhouses will not have any detrimental effect on the ability to remove the sand and gravel resource from the licensed pit located adjacent to the development south	**OTTAWA (Planning)**

of Block 293.

13. The Owner acknowledges that prior to registration of the plan of subdivision, the City of Ottawa shall be satisfied that the Municipal Capital Facilities Agreement (MCFA), for both the Residential and Business Park components of the development, has been signed and the development is proceeding in accordance with MCFA to the satisfaction of the director of REPDO. **OTTAWA (Planning) (REPDO)**

14. Prior to registration the Owner agrees to prepare a fire protection plan to the satisfaction of Fire Protection Services. **Ottawa (Fire Services)**

Zoning

15. Prior to registration of the plan of subdivision, the City of Ottawa shall be satisfied that the proposed plan of subdivision conforms with the applicable official plan and complies with the applicable zoning by-law approved under the requirements of the Planning Act, with all possibility of appeal to the Ontario Municipal Board exhausted. **OTTAWA (Planning)**

Schools

16. The Owner is required to inform prospective purchasers that school accommodation problems exist in the Ottawa-Carleton District School Board schools designated to serve this development and that at the present time this problem is being addressed by the utilization of portable classrooms and/or by directing students to schools outside their community. **OCDSB**

Highways/Roads

17. The design of all road cross sections, road intersections, including geometric, intersection spacing, grades, the conveyance of the necessary sight triangles and required 0.3 m reserves necessary for lot access control, shall be to the satisfaction of the City of Ottawa. The northern boulevard of Streets 6 and 15, where they abut lands owned by others, will be 12m in width, protecting existing vegetation. **OTTAWA (Planning)**

18. The Owner shall undertake any additional Traffic and Transportation studies subsequent to the Transportation Impact Study submitted with the Draft Plan of Subdivision application as required by the City in order to provide approval for future phases of development within the draft plan of subdivision. **OTTAWA (Planning)**

19.	Any additional Traffic and Transportation studies shall be undertaken by a Professional Engineer with expertise in traffic analysis and shall comply with the City of Ottawa's Transportation Impact Assessment Guidelines (2006) in identifying TDM measures and analyzing traffic impacts, transit impacts, and implications for pedestrian and cyclist movements. The methodology and analysis principals shall be to the satisfaction of the City.	**OTTAWA (Planning)**
20.	All streets shall be named to the satisfaction of the City of Ottawa.	**OTTAWA (Planning)**
21.	The Owner agrees that it shall construct streets in accordance with the approved construction phasing plan. This phasing plan shall include a portion of the hangar lots, communal hangars, non hangar residential lots, and business park properties.	**OTTAWA (Planning)**
22.	The Owner agrees that it shall upgrade Diamondview Road at his sole cost, from the entrance to the subdivision north to March Road as part of the first phase of development to the satisfaction of the City of Ottawa.	**OTTAWA (Planning)**
23.	The Owner shall pay all expenses including but not limited to land acquisition, contract drawings preparation, utility relocations, advertising, road work, construction supervision, as built drawings preparation, and other engineering and administrative costs for the construction of any intersections as recommended by the approved study(s).	**OTTAWA (Planning)**
24.	The Owner agrees to provide access for emergency vehicles at all times by way of providing two (2) separate and distinct accesses to the Subdivision(s); one access may be temporary during construction.	**OTTAWA (Planning)**
25.	The Owner acknowledges and agrees that all construction traffic shall enter the site primarily from Carp Road and where required Thomas Argue Road. Diamondview Road will not be used as a construction access. The Owner further agrees to post signs at appropriate locations on Diamondview Road to indicate that the road is not a construction access route and that all construction traffic should access the subdivision lands from Carp Road (or Thomas Argue as appropriate). The Owner further acknowledges and agrees that he will repair any damage caused to Thomas Argue Road as a result of construction traffic associated with this development.	**OTTAWA (Planning)**
26.	The Owner shall provide temporary turnarounds for all streets terminating at the edge of any construction phase of development, prior to registration,	**OTTAWA (Planning)**

to the satisfaction of the City of Ottawa.

27. The Owner shall be responsible for 100% of the cost and installation of all permanent and temporary street name signs, caution signs and traffic signs that may be required in accordance with City specifications. All signs shall be installed and located to the satisfaction of the City and installed prior to the City's acceptance of the roads within the subdivision. **OTTAWA (Planning)**

28. Prior to registration the Owner shall submit to the Ministry of Transportation for review and approval a copy of a stormwater management plan indicating the intended treatment of the calculated run off. **(MTO)**

29. Prior to registration, the Owner shall submit a copy of a traffic study addressing the impact of traffic from this development upon the Highway 417 interchange and if necessary, provide recommendations to mitigate any adverse effects. Any improvements to the interchange facility required as a result of the development will be the responsibility, financial and otherwise of the owner and will be covered by an agreement between the owner and the Minstry of Transportation. **(MTO)**

Sidewalks, Walkways, and Fencing

30. The Owner shall construct a sidewalk on one side of Street 1, Street 9, and Street 6 and provide a pedestrian link along the south side of Street 6 to connect to the park block subject to the provisions of the MCFA. **OTTAWA (Planning)**

31. The Owner shall provide a 1.5 metre high black vinyl coated chain link fence along the rear and side property lines of all lots adjacent to the conservation lands (Blocks 283 and 284) to clearly indicate property limits while minimizing vegetation damage and/or loss. The fence shall be situated within the private lots, 0.3 metres from the property line. **OTTAWA (Planning)**

32. The Owner shall submit a Streetscape Planting Plan to the satisfaction of the Director of Planning and Infrastructure Approvals, prior to registration. Such plan shall include as a minimum the provision of one tree per interior lot and two trees per exterior lot. Non-native invasive species shall not be included in the planting plan. Locally appropriate native species are preferred. The Streetscape Planting Plan approval will be subject to Transport Canada regulations. **OTTAWA (Planning)**

33. The Owner(s) agree to construct a 1.8 m wide paved pathway on all pathway blocks and to install a fence and a cedar hedge within the pathway block 0.3 metres from the property line. **OTTAWA (Planning)**

34. The Owner(s) agree to construct a 1.8 m wide paved pathway through **OTTAWA**

Block 279 to connect Street Five and Street Six. **(Planning)**

35. A pathway block will be introduced between Lots 96 and 97 to connect the pathway within Block 284 (Carp Creek corridor) to Street Eight if appropriate. **OTTAWA (Planning)**

36. A pathway will be incorporated into the landscape design of the stormwater management block, Block 330 to connect Block 292 to the pedestrian link to one side of Street Six.. **OTTAWA (Planning)**

37. Appropriate security fencing (example 2.4M chain link) shall be installed by the Owner as per the MCFA. **OTTAWA (Planning) (REPDO)**

38. The owner shall provide environmentally appropriate pathways along the periphery of the Carp Creek corridor adjacent to residential lots. The alignment and design will be determined in consultation with Environmental Sustainability and Parks and Recreation Planning staff, confirmed in the field and be shown on the final landscaping/ streetscaping plan. **OTTAWA (Planning)**

Land/Streetscaping

39. The Owner shall provide 15 metre landscape buffer and fencing to provide screening of the subdivision from Diamondview Road. A landscaped buffer strip with a minimum width of 7 metres and fencing shall be provided behind Lots 151 to 155 to screen the subdivision from the adjacent residence. A landscaped buffer strip with a minimum width of 12 metres and fencing shall be provided behind Lots 5 to 20 and lot 23 and along the northern boundary of the Airport Business Park from the east limit of Street 15 to the west limit of the storm water pond to screen the subdivision from the adjacent agricultural lands. **OTTAWA (Planning)**

40. The Owner shall provide a 12 metre landscape buffer in Block 305 to provide screening of the subdivision from Carp Road. **OTTAWA (Planning)**

41. The Owner acknowledges and agrees to have prepared by a qualified landscape architect such streetscaping and landscaping plans as are necessary to provide locations and details of the following; (All streetscaping and landscaping plans will be subject to Transport Canada regulations. **OTTAWA (Planning)**

1. Perimeter security fencing requirements
2. Fencing and buffer landscaping along Diamondview and Carp Road
3. Fencing along rear and side lots abutting conservation lands
4. All asphalt pathways and associated fencing and hedging requirements

5. One tree per interior lot and two trees per exterior lot on private property (native species preferred, no non-native invasive species allowed).
6. Landscaping of entrance/gatehouse at street one and Diamondview Road
7. Trees/shrubs proposed to be preserved and/or planted to fulfill the requirement for a Final Tree Preservation and Planting Plan (only locally appropriate native species will be accepted in or adjacent to natural areas).
8. Landscaping of the stormwater management block
9. Streetscape lighting design and location.
10. Location of pathways along the periphery of the Carp Creek corridor.
11. Landscaping, buffering and signage on Blocks 309-315 to provide separation between vehicular and air traffic.
12. Fencing and buffer landscaping between lots 5 to 20, and lot 23 and the adjacent lands to the north, owned by others and will consist of native conifer tree species such as White Spruce or Norway Spruce, and will be planted with appropriate spacing to provide reasonable buffering/screening as required - but will generally be 3 rows staggered in the order of 7 feet on centre.
13. Tree preservation and screening of the boulevard of the north side of street six in the area north of Block 332. Planting will consist of native conifer tree species such as White Spruce, Norway Spruce and Sumac, and will be planted with appropriate spacing to provide reasonable buffering/screening as required.
14. Tree preservation and landscaping of the boulevard on the north side of Street 15 and in the buffer strip along the northern boundary of the Airport Business Park from the east limit of Street 15 to the west limit of the storm water pond adjacent to lands owned by others. Planting will consist of existing trees and planting of native tree and bush species such as White Spruce or Norway Spruce, Ash, Maple, Sumac, Lilac and will be planted with appropriate spacing to provide reasonable buffering/screening as required - but will generally be 3 rows staggered in the order of 7 feet on centre.
15. Conifer trees used to landscape the buffer areas adjacent to lots 5 to 20, and lot 23 and in the boulevard areas adjacent to the soccer fields will generally be nursery stock a minimum of 5ft. tall.
16. Additional landscaped screening will be provided in the 12m wide boulevard in the area of the proposed soccer fields and will consist of native conifer tree species such as White Spruce or Norway Spruce, and will be planted with appropriate spacing to provide reasonable buffering/screening as required - but will generally be 3 rows staggered in the order of 7 feet on centre.

42. The Owner agrees to have prepared by a qualified landscape architect a landscape plan for the Stormwater Management block. Proposed plantings will be subject to Transport Canada regulations and should consist of locally appropriate native species only. **OTTAWA (Planning)**

Parks

43. Blocks 285 & 332 shall be dedicated to the City for parkland purposes as per the MCFA and to the satisfaction of Parks and the Real Estate Partnership and Development Office (REPDO). The Owners shall grade areas of parkland, where necessary, to match approved adjacent grades, so as to provide a uniform, surface free of debris with sufficient topsoil and grass seed necessary to establish a clean and maintainable surface. No storage of building materials, including granular and topsoil, will be permitted on the park block. A 1.5 metre high black vinyl coated chain link fence shall be constructed along the boundary lines to the satisfaction of the Parks and Recreation Branch. **OTTAWA (REPDO) (Planning) (Parks)**

44. That the Owner acknowledges and agrees that should the dedication of Blocks 285 & 332 not fulfill the requirements of the Planning Act for the dedication of parkland, cash-in-lieu for the balance of parkland dedication will be required at the time of registration. **OTTAWA (Planning) (Parks)**

45. The Owner shall, as part of the required works, and at no cost to the City, provide storm, water, and sanitary services and hydro service to the property line of all park blocks. **OTTAWA (Planning) (Parks)**

46. That the Owner shall provide, at no cost to the City, a complete MDS I and MDS II study prior to the acceptance of Block 332 for parkland purposes. The Owner further acknowledges and agrees that should the MDS I and MDS II study conclude Block 332 is not suitable for parkland development purposes (sports fields), the Owner must re-design the draft plan of subdivision, at no Cost to the City, to provided a minimum 5.0 hectare parcel of land suitable for parkland development (sports fields). **OTTAWA (Planning) (Parks)**

Environmental Constraints

47. The Owner acknowledges and agrees that the implementation of the subdivision shall be in accordance with the recommendations found in the report "Integrated Environmental Review", (Muncaster Environmental Planning, as Revised January, 2007). **OTTAWA (Planning)**

48. The Owner(s) shall implement the mitigation and monitoring measures stated in the report "Integrated Environmental Review", (Muncaster Environmental Planning Inc., as Revised January, 2007) and any addendums to this report to the satisfaction of the City which include but are not limited to: **OTTAWA (Planning)**

- The limits of the natural areas and buffers will be clearly delineated with silt and construction fencing prior to any grading or other site alterations;
- Removal of woody vegetation will not occur between April 1st and August 15th to protect breeding birds (unless otherwise directed in writing by Environment Canada, Transport Canada, OR unless a breeding bird survey, conducted within 5 days of removal, indicates no breeding birds are present);
- No in-stream works within the watercourse will occur between March 15th and June 30th;
- Protection of trees and root system during blasting.
- Monitoring of mitigation measures for the construction and the post-construction operation periods.

49. The Owner(s) shall prepare to the satisfaction of the City, a Conservation Handbook describing the natural attributes of the subdivision and the importance of good stewardship practices to ensure the long-term health and sustainability of Carp Creek and the retained woodlands. Topics to be discussed include but are not limited to reducing environmental impacts from common household activities, (e.g., water conservation, merits of minimizing impervious surfaces, yard waste disposal, chemical use and storage, etc.), activities specific to this subdivision (ie airplane storage)avoiding human-wildlife conflicts, and recommendations of locally appropriate native species for landscaping. The Handbook shall be distributed to all new homeowners. **OTTAWA (Planning)**

50. The Owner shall provide interpretative signs for the trails within the "Carp Creek corridor" to indicate the sensitive nature of the creek and woodlands in the subdivision. The signage will indicate that motorized vehicles will not be permitted in the natural areas or passive parklands. Content and locations of signs will be to the approval of the City. **OTTAWA (Planning)**

51. The Owner shall dedicate at no cost to the City Blocks 283, 284 and 333 in healthy and restored condition to the City as "conservation lands". The Owner shall pay the land transfer tax associated with the dedication of these lands if applicable. **OTTAWA (Planning)**

52. The Owner(s) shall undertake to protect all existing vegetation on site; subject to the provisions of Transport Canada; until such time as a "Detailed Tree Planting and Conservation Plan" is approved by the City and the vegetation communities and specimen trees which are to be conserved are appropriately marked with snow fencing on-site. Particular attention shall be paid to the preservation of the hedgerow within business park development blocks 300, 301 and 302. The "Detailed Tree Planting and Conservation Plan" shall be prepared by a qualified landscape architect and shall be integrated with the "Grading and Drainage Plan", the "Integrated Environmental Review", and the "Stormwater Site Management Plan and Erosion and Sediment Control Plan". **OTTAWA (Planning)**

53. All proposed landscape plantings for the site shall consist of locally appropriate native species where possible. Only native species shall be planted in or adjacent to natural areas. Non-native invasive species (including but not limited to Norway Maple, Amur Maple, Black Locust, Scots Pine and all non-native Honeysuckles) shall not be included in the planting plan. **OTTAWA (Planning)**

54. At the completion of each construction phase of the development, and prior to the commencement of each subsequent construction phase, the Owner shall ensure that these conditions of approval and associated mitigation measures as described in the IER have been implemented to the satisfaction of the City of Ottawa. Any necessary amendments to these conditions or mitigation measures, based on observed effectiveness or opportunities for improvement, shall be documented and approved by the City of Ottawa. **OTTAWA (Planning)**

55. The developer acknowledges that development within any watercourse or stream valley may require a Development, Interference with Wetlands, and Alteration to Shorelines and Watercourses permit (O.Reg.153/06) from Mississippi Valley Conservation prior to construction. **MVC**

56. For Carp Creek, the minimum setback to development shall be the greater of: 15m from top of bank; 30m from normal high water; a 3:1 slope up from a 15m erosion allowance from the edge of the main channel of the watercourse. These setbacks shall be shown on a Grading Plan, and can not extend into the lot limits. **OTTAWA (Planning) MVC**

57. For watercourses where fish habitat is present as described in the Integrated Environmental Review, dated January 2007, with the exception of Carp Creek, the setback to development shall be 15m from the existing top of bank. The final plan for registration shall show a block comprised of the tributary in the north-east corner and the above noted 15 m setback to be dedicated to the City for conservation purposes. **OTTAWA (Planning) MVC**

58. Subject to Transport Canada rules and regulations, the non-vegetated riparian corridors are to be restored to a vegetated state per the Carp River Watershed - Subwatershed Study, Section 8.2.3.1. Within the required Tree Preservation and Planting Plan provide a planting plan for each phase of work, showing the plantings that are to be undertaken adjacent to or within each phase of development of the site. **OTTAWA (Planning) MVC**

Archaeology

59. The Owner shall adhere to the procedures of the "Contingency Plan for the Protection of Archaeological Resources in Urgent Situations" as approved by the Ministry of Citizenship, Culture and Recreation in the Archaeological Resource Potential Mapping Study of the City of Ottawa. **OTTAWA (Planning)**

Geotechnical

60. The Owner shall submit a geotechnical report prepared by a qualified Geotechnical Engineer, licensed in the Province of Ontario, containing detailed information on Geotechnical matters and recommendations pertaining to, but not limited to the following: **OTTAWA (Planning)**

- the existing sub-surface soils and groundwater conditions,
- slope stability and erosion protection, in addition to any building construction requirements adjacent to unstable slopes,
- design and construction of underground services,
- design and construction of internal roadways,
- design and construction of any retaining walls or slope protection,
- design and construction of engineered fill,
- design and construction of building foundations, and
- site dewatering

61. The Owner shall retain the services of the previously referred to Geotechnical Engineer to ensure that the recommendations of the report are fully implemented. The owner shall provide the Director, Infrastructure Services, with certificates of compliance issued by the engineer with respect to each of the matters referred to in the preceding condition. **OTTAWA (Planning)**

Stormwater Management

62. Prior to the commencement of any construction phase of this subdivision (roads, utilities, any off site work, etc.) the owner shall: **OTTAWA (Planning)**
    - have an Erosion and Sediment Control Plan prepared by a Professional Engineer in accordance with Current Best Management Practices,
    - have such a plan approved by the City of Ottawa, and
    - provide certification to the City of Ottawa through a Professional Engineer that the plan has been implemented.

63. Prior to registration, or prior to an application for a Certificate of Approval for any stormwater works (whichever comes first), the Owner shall prepare a Stormwater Site Management Plan in accordance with the details of the report Conceptual Stormwater Management Plan (revised February 2007, Novatech Engineering) and any addendums to this report to the satisfaction of the City. The Stormwater Site Management Plan shall identify the sequence of its implementation in relation to the construction of the subdivision and shall be to the satisfaction of the City of Ottawa and the Mississippi Valley Conservation Authority. **OTTAWA (Planning) MVC**

64. On completion of all stormwater works, the Owner agrees to provide certification to the City of Ottawa through a Professional Engineer that all measures have been implemented in conformity with the Stormwater Site Management Plan. **OTTAWA (Planning)**

65. That the Owner acknowledges and agrees that no work shall commence within any construction phase of the Plan of Subdivision until such time as the storm water management measures and plan to implement the measures has been approved by the City and any other approval agency. **OTTAWA (Planning)**

66. The owner shall monitor water quality (including temperature) of the stormwater facility per the Ministry of Environment Certificate of Approval requirements and as outlined in the Stormwater Site Management Plan to the satisfaction of the City of Ottawa and the Mississippi Valley Conservation Authority as required. The monitoring **OTTAWA (Planning) MVC**

strategy should incorporate details of location of the sampling, type of sampling, frequency and a parameter list consistent with the needs of the receiving aquatic environment. Tests shall be completed by an independent and approved laboratory and the results shall be made available in an approved format and timing acceptable to the City of Ottawa and Mississippi Valley Conservation Authority as required.

67. The Owner shall design, and construct the stormwater management facility(s) at its sole cost. The Owner agrees that the stormwater management ponds will be, maintained and operated by the city per the Municipal Capital Facilities Agreement. The storm sewer system will be maintained and operated by the city per the Municipal Capital Facilities Agreement. Private underground services and other utilities will be located outside the travelled portion of the road. The cross-section for the roadways will be designed to the satisfaction of the Director of Planning and Infrastructure Approvals. **OTTAWA (Planning)**

68. The Owner agrees to undertake testing of all existing wells in an area of influence from the development to establish a baseline for existing water quality and quantity for each well. The testing and recommendations will be provided by a professional engineer with expertise in this area. Testing will take place before, during and after the completion of each phase of development. The Owner also agrees that if results indicate a negative impact on the well due this development , then the Owner agrees to take required steps to provide the impacted landowner with water quality and quantity of equal or greater quality and quantity. Copies of the results of all testing will be provided to the City. **OTTAWA (Planning)**

69. That the Owner agrees to grade, landscape and install erosion control measures on any portion of the proposed lots or adjacent lands in the possession of the Owner which have been filled or where the natural vegetation has been disturbed which, in the opinion of the City, is creating a nuisance, hazard and/or eyesore. **OTTAWA (Planning) MVC**

70. The stormwater outlet(s) shall be designed and constructed to ensure minimal amount of disturbance to Carp Creek. The mitigation measures should be clearly documented in the Stormwater Site Management Plan to be prepared for the subdivision. **OTTAWA (Planning) MVC**

71. The targets set in the Carp River Watershed - Subwatershed Study for Aquatic Habitat (Table 8.2.2) for Type 2 Fish Communities shall be met for Carp Creek and the south-east tributary of the Carp River (up stream of the Carp Road ditch), including 25C maximum water temperature. The targets for Type 3 Fish Communities shall be met for the north-east tributary of the Carp River, including 30C maximum water temperature. In addition, discharge to any of the stream corridors **OTTAWA (Planning) MVC**

requires 70% TSS removal, per MOE Stormwater Management Planning and Design Manual. Pre-development flow rates off of the site shall not be exceeded by post-development flow rates. A detailed Stormwater Management Plan, including the design and expected performance of all required stormwater management facilities, shall be provided for approval.

Fisheries

72. Wording shall be included in the subdivision agreement and in all offers of purchase and sale for Lots adjacent to watercourses informing the owners that the purpose of the setbacks is to protect fish habitat and that the natural vegetation within the setback be retained. **OTTAWA (Planning)**

73. The developer acknowledges that Carp Creek and the tributary to the Carp River in the north east of the property and the tributary to the Carp River in the south west corner of the property are fish habitat. As such, any Harmful Alteration, Disturbance, or Destruction of Fish Habitat will require an Authorization from the Department of Fisheries and Oceans. This would include, but is not limited to, culvert placement, open cut service crossings, and channel realignment. **MVC**

74. Any modifications required to the subdivision design and/or layout will be at the sole expense of the proponent. **OTTAWA (Planning) MVC**

Urban Servicing

75. The Owner shall prepare a development phasing and a construction phasing plan to the satisfaction of the General Manager, Planning and Growth Management. These phasing plans shall also setout appropriate phasing for water, sanitary and stormwater facilities. **OTTAWA (Planning)**

76. The Owner shall be responsible for the provisions of the following private services, at its cost, to the satisfaction of the City, and/or the Province; **OTTAWA (Planning)**

1. Watermains
2. Sanitary Sewers
3. Storm Sewers
4. Roads
5. Street Lights
6. Sidewalks
7. Landscaping
8. Street name, traffic and caution signs
9. Stormwater management facilities
10. Pump Station (water servicing)
11. Sanitary Treatment Facility

77. The Owner shall, prior to connecting additional businesses to the existing low volume non-residential water supply, submit an Existing Conditions Assessment Report to the satisfaction of the General Manager, Planning and Growth Management. **OTTAWA (Planning)**

78. The Owner shall, prior to providing new services to businesses on the Airport Lands currently using existing privately-owned sanitary services and/or the low volume non-residential water supply, submit a Decommissioning Plan for the existing services of that business to the satisfaction of the General Manager, Planning and Growth Management. **OTTAWA (Planning)**

79. The Owner shall submit detailed servicing plans, prepared by a Civil Engineer licensed in the Province of Ontario, to the Director of Planning and Infrastructure Approvals. All servicing designs will be to the satisfaction of the Director of Planning and Infrastructure Approvals. **OTTAWA (Planning)**

80. The Owner shall submit detailed grading and drainage plans for this subdivision, prepared by a Civil Engineer licensed in the Province of Ontario, to the Director of Planning and Infrastructure Approvals. **OTTAWA (Planning)**

81. The Owner shall have competent professional engineering inspection personnel on site at all times during the period of construction to supervise the Works and the Director, Infrastructure Services shall have the right at all times to inspect the installation of the Works. Should it be found in the sole opinion of the Director, Infrastructure Services that such personnel are not on site or are incompetent in the performance of their duties, or that the said Works are not being carried out in accordance with approved plans or specifications and in accordance with good engineering practice, then the Director, Infrastructure Services may order all work in the project to be stopped. **OTTAWA (Planning)**

82. The Owner shall obtain such permits as may be required from Municipal, or Provincial authorities and shall file copies thereof with the Director of Planning and Infrastructure Approvals. **OTTAWA (Planning)**

83. The Owner shall prepare, entirely at his cost, a hydraulic network analysis of the proposed water plant within the plan of subdivision and as it relates to the existing infrastructure. Said report shall be submitted to the City of Ottawa for review and approval as part of the water plant design submission. **OTTAWA (Planning)**

84. The Owner shall prepare a design report that reflects the phasing of water needs and the impact on the Carp Village Water Plant. The design **OTTAWA (Planning)**

of the water service along Carp Road must be consistent with this design report. This design must be prepared to the satisfaction of the Director of Planning and Infrastructure Approvals. Capacity beyond Phase 1 is subject to the approval of the Director of Planning and Infrastructure Approvals and the Director of Planning, Environment and Infrastructure Policy Branch.

85. The Owner acknowledges and agrees If the Carp Airport development is to be served by a communal water system utilizing the water supply system in the Village of Carp as a source, then the communal water system will include the watermain from the Village to the limit of the Carp Airport as part of the MCFA for the Airport or under such other agreement as the City may require. **OTTAWA (Planning)**

86. The Owner shall enter into a Responsibility Agreement for operation and maintenance of the Sanitary Treatment Facility, and Water treatment and/or Pump Station. **OTTAWA (Planning)**

87. The plan shall be revised to include a block for the sanitary treatment facility once the land requirements are known. **OTTAWA (Planning)**

Building Permits

88. The Owner shall not demand of the City to issue, nor shall anyone claiming title from it or under its authority, demand of the City to issue, one or more building permits to construct any building or other structure on any lot or block on the Site until: **OTTAWA (Planning)**

- applicable roads in the Subdivision have been connected to a public street;
- the Municipal Capital Facilities Agreement (MCFA) and a Responsibility Agreement for both the Residential and Business Park components of the Development has been signed and the Development is proceeding in accordance with the MCFA and Responsibility Agreement;
- a fire protection plan has been approved by Fire Protection Services and access for fire fighting equipment has been provided to each building by means of a street or private roadway, which shall be designated and posted to the satisfaction of the General Manager, Planning and Growth Management and the Emergency and Protective Services Department;
- the access route has been surfaced with concrete, asphalt, or Granular "A" base capable of permitting accessibility under all climatic conditions and is continuously maintained so as to be immediately ready for use by the Emergency and

Protective Services Department vehicles or any other vehicles in the event of an emergency;

- the City has approved, where applicable, a site plan, a grading plan and a design plan for the proposed building or structure and;
- the water distribution system has received all applicable Certificates of Approval from MOE;
- the Sanitary Waste Treatment Facility has received all applicable Certificates of Approval from MOE;
- Storm Water Management Pond has received all applicable Certificates of Approval from MOE;
- a development phasing plan and a construction phasing plan have been approved by the Director of Planning and Infrastructure approvals and securities consistant with the phasing plan have been posted with the City of Ottawa to the satisfaction of the Director of Planning and Infrastructure approvals.

Utilities

89.	Such easements and maintenance agreements which may be required for electrical, gas, water, sewer, telephone and cablevision facilities, shall be provided and agreed to by the Owner, to the satisfaction of the appropriate authority; and that the Owner shall ensure that these easement documents are registered on title immediately following registration of the final plan; and the affected agencies are duly notified.	**Rogers Cable TV, Bell Canada, Enbridge Consumers Gas, Hydro One Networks**
90.	Where the relocation or removal of any existing on-site/adjacent utility facility, including water, sewer, electrical, gas, telephone and cablevision, is required as a direct result of the development, the Owner shall pay the actual cost associated therewith to the satisfaction of the appropriate utility authority.	**Rogers Cable TV, Bell Canada, Enbridge Consumers Gas, Hydro One Networks**
91.	The Owner shall coordinate the preparation of an overall utility distribution plan showing the location (shared or otherwise) and installation, timing and phasing of all required utilities (on-grade, below-grade or above-grade), including on-site drainage facilities and streetscaping)--such location plan shall be to the satisfaction of all affected authorities and shall consider their respective standards and specification manuals, where applicable.	**Rogers Cable TV, Bell Canada, Enbridge Consumers Gas, Hydro One Networks**

Purchase and Sale Agreements and Covenants on Title

92. A warning clause will be inserted into the subdivision agreement and in all offer of purchase and sale agreement, to read as follows: **OTTAWA (Planning)**

- The Purchaser acknowledges the sensitive environmental nature of Carp Creek, and adjacent woodlands , the importance of good stewardship practices to ensure the health and sustainability of these natural features and that it is the City's intent to protect the Carp Creek corridor and woodlots and leave them in a natural state for the long term.

- The Purchaser undertakes and agrees that composters, garden plots, yard waste pile or other disturbances will not occur on City owned land.

- The Purchaser undertakes and agrees that all roof leaders will be directed to pervious areas such as lawns to enhance ground water recharge.

- The Purchaser acknowledges that occupancy cannot be permitted until sanitary water and storm services are in operation to the satisfaction of the City

- The Purchasers acknowledge that the lots are located in an agricultural area and may therefore be subjected to noise, dust, odours and other activities associated with an agricultural area.

- The Purchasers acknowledge that they are purchasing land that is part of an active airport and as owners of land in an active airport they are subject to Transport Canada rules and regulations established for the operation of the Airport and will develop, and operate and contribute to the life cycle and operational costs of the Airport as per the terms of the MCF Agreement.

- The Purchasers acknowledge that they must enter into a Common Elements Agreement for all commonly owned components of the subdivision as described in the Common Elements Condominium Agreement. The City, through the Municipal Capital Facilities Agreement, will maintain surface facilities within the Right Of Way including and limited to the pavement, curbs, sidewalks, signage and street lights.

93. Any person who, prior to draft approval, entered into a purchase and sale agreement with respect to lots or blocks created by this subdivision, shall be permitted to withdraw from such agreement without penalty and with full refund of any deposit paid, up until the acknowledgment noted below. The owner shall provide the City of Ottawa Legal Services Branch an acknowledgment from those purchasers who signed before the plan was draft approved, that the plan had not received draft approval by the City of Ottawa. The owner agrees that the purchase and sale agreements signed prior to draft approval shall be amended to contain a clause to notify purchasers of this fact. **OTTAWA (Planning) OTTAWA (Legal)**

Financial Requirements

94. The Owner acknowledges that some of the works of the Subdivision are eligible for financial contributions from the City's Development Charge Reserve Fund pursuant to the Development Charge Bylaw. Such contributions are to be determined and agreed to by the City, prior to the commencement of the associated works or as agreed to by the City. The Owner agrees to enter into any agreements that may be required pursuant to the Development Charge Bylaw. **OTTAWA (Planning)**

95. The Owner shall pay all expenses including but not limited to land acquisition, contract drawings preparation, utility relocations, advertising, road work, traffic signal lights installation, construction supervision, as built drawings preparation, and other engineering and administrative costs for the modification of the intersection(s) and installation of an additional traffic lane(s) along the affected roads as per the updated Transportation Impact Study and shall provide financial security in the amount of 100% of the cost of implementing the required works. **OTTAWA (Planning)**

96. Prior to registration of the plan of subdivision, the City of Ottawa shall be satisfied that the processing fee has been paid in full. **OTTAWA (Planning)**

97. Prior to registration, the Owner acknowledges and agrees that a charge to recover a contribution towards that portion of the water system in the Village of Carp that would serve the Carp Airport and not greater than the cost to service lands in the village will apply, to the satisfaction of the Director of Planning and Infrastructure Approvals. **OTTAWA (Planning)**

Survey Requirements

98. The plan of subdivision shall be referenced, where possible, to the Horizontal Control Network, in accordance with the City requirements **OTTAWA (Surveys)**

and guidelines for referencing legal surveys.

Closing Conditions

99. The owner shall inform the purchaser after registration of each lot or block of the development charges that have been paid or which are still applicable to the lot or block. The applicable development charges shall be as stated as of the time of the conveyance of the relevant lot or block and the statement shall be provided at the time of the conveyance. The statement of the owner of the applicable development charges shall also contain the statement that the development charges are subject to changes in accordance with the *Development Charges Act, 1997* and the *Education Development Charges Act.* **OTTAWA (Legal)**

100. At any time prior to final approval of this plan for registration, the City of Ottawa may, in accordance with Section 51 (44) of the Planning Act, R.S.O. 1990, amend, delete or add to the conditions and this may include the need for amended or new studies. **OTTAWA (Legal)**

101. The City of Ottawa Subdivision Agreement shall state that the conditions run with the land and are binding on the owner's, heirs, successors and assigns. **OTTAWA (Legal)**

102. Prior to registration of the plan of subdivision, the City of Ottawa is to be satisfied that Conditions 1 to 102 have been fulfilled. **OTTAWA (Planning)**

103. If the plan of subdivision has not been registered by November 16, 2016 the draft approval shall lapse pursuant to Section 51 (32) of the Planning Act, 1990. Extensions may only be granted under the provisions of Section 51 (33) of said Planning Act prior to the lapsing date. **OTTAWA (Planning)**

Appendix B

Correspondence

Lisa Bowley

From: Hall, Kevin [Kevin.Hall@ottawa.ca]
Sent: August-07-13 11:28 AM
To: Susan Gordon
Cc: Lisa Bowley
Subject: FW: Carp Airport

Susan

Below are the comments I received on the Hydraulic Analysis. If you have any questions please give me a call.

- Provide further clarity on the extent (interim and ultimate) of the Northern Industrial Area (NIA) to be supplied with domestic water via a 100 mm watermain
- Provide consistent nomenclature and labelling of meter chambers and backflow prevention chambers on all drawings
- Figure 5 is not consistent with Drawing 102085-W1
- Pump house plan and section process plans are missing information.
- Report should clarify that maximum pressure limit is 100 psi in unserviced areas, and 80 psi in serviced areas, as per OBC.
- The residential max day peaking factor, and the business park peaking factors in Table 1 are not in accordance with City guidelines (unless I am unaware of a recent change). Furthermore, based on the peaking factor provided in the report, the max day and peak hour rates for Phase 1 do not appear to be correct. The numbers in Table 1 should be verified and corrected where required.
- The boundary conditions provided in the report do not appear to match the City boundary conditions as provided in Appendix B.
- The water age assessment should consider "typical" per dwelling unit demand, rather than design demands. A per dwelling unit rate of 540 L/day should be considered. This implies significantly higher bleed rates than what is projected in the report.
- Provide information in main body of the report on the high lift pump sizing, design HGL, and operation under the full range of expected conditions, considering interim and ultimate conditions.
- Provide discussion in the main body of the report on the network modelling and expected levels of service as presented in Appendix C.

Kevin Hall C.E.T.
Project Manager, Infrastructure Approvals
Development Review (Rural Services)
Planning and Growth Management
Planning and Infrastructure
City of Ottawa
4th Floor, 110 Laurier Ave.
MC. 01-14

(613) 580-2424 x27824
Kevin.Hall@ottawa.ca

Lisa Bowley

From: Hall, Kevin [Kevin.Hall@ottawa.ca]
Sent: July-12-13 11:11 AM
To: Susan Gordon
Cc: Pete Van Grootheest; Ostafichuk, Jeffrey
Subject: Carp Airport 3rd revision
Attachments: 3rd submission July 10, 2013.doc

Susan

Attached are the engineering comments on the 3rd submission for the redevelopment of the Carp Airport. As mentioned in my voicemail Comments on the Hydraulic Analysis will still be a couple of weeks away due to vacation of the reviewer. However here are all the comments from other City departments.

If you have any questions please give me a call.

Kevin Hall C.E.T.
Project Manager, Infrastructure Approvals
Development Review (Rural Services)
Planning and Growth Management
Planning and Infrastructure
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Kevin.Hall@ottawa.ca

MEMO / NOTE DE SERVICE

To / Destinataire	Susan Gordon P.Eng. Novatech Engineering	File/N° de fichier: D07-16-10-0016
From / Expéditeur	Kevin Hall C.E.T.	
Subject / Objet	1500 Thomas Argue Road Carp Airport	Date: July 10, 2013

Susan

Below are comments on the third submission of the engineering design for the Carp Airport.

General:

1. Have the utility companies approve the non-standard cross section?
2. The street names need to be added to the drawing layout plan.

GP1:

3. The rear yard cbs that connect to the street should be cb manholes when rear yard subdrains are connected to the system. Ex cb 69 & 81.

GP2:

4. Please provide a blow up or a site plan of the sewage and water storage site.

GP7:

5. Remove hydrants fronting onto Thomas Argue Drive. They are not required.

GP9:

6. Ditch layout at Carp Road will not work well with two 90 degree bends in the ditch. Please revise the layout.

P6:

7. Provide a culvert in Wingover Private for the pathway crossing the ditch.

P8:

8. P8 and GP4 does not match for the layout of pipes and the treatment plant.
9. Sanitary forcemain is not shown on this plan.

P18:

10. There are too many alignment changes of the watermain crossing taxiway 2. Please straighten.

P19:

11. Why is there a 300mm subdrain under the ditches? What is the capture area of this drain? Subdrain doesn't continue on other drawings upstream?

P50:

12. The proposed culvert on Russ Bradley at station 50+270 needs to be 2.8mm thick if it is one that the City will be responsible for.

P52:

13. If Huisson Road is to be maintained by the City, then the two abandoned culverts need to be removed.

Servicing Report:

14. Update the sewer design sheets with the new street names.
15. Storm Pipe from MH229-237 is too close to capacity. Please increase the size.

Stormwater Report:

16. Where did the 5 and 100 year release rates come from for the business park. The 26L/s/ha is below the pre-development release rate and well below a release rate calculated using c= 0.5 in a suburban development. Please revise or explain.
17. The stormwater reports is not clear as to if a storm pond is required in the north east corner of the business park. The report says "if require" When will that decision be known? If one will be required then it should be required in Phase one since phase one sites drain to that area.

Hydraulic Network Analysis:

18. What units need PRVs?
19. In section 6.0 it needs to be stated that the watermain is private from the connection to the City main down to the site. Not after the meter and backflow chambers.

Geotech Report:

20. Page 11 & 12 speak to permissible grade raise at the buildings, but the minimum permissible grade raise is yet to be determined. We need to know the grade raise restrictions for the roads also.
21. Show the grade raise restrictions on a plan. We need to know the areas that are restricted.
22. There are a number of areas of road that may be above the permissible grade raise. How will this be dealt with? We discourage the use of styraform blocks.

Comments on Stormwater Facilities

1. Islands or significantly raised areas are not recommended in dry ponds as they present potential areas of entrapment, please remove.
2. Place cooling trench under swale.
3. Stop log gains are not needed on inlet structures, please remove.
4. Post and rail fences are to be three rail.
5. West Facility
    a. Please provide cross-section through pond.

b. The access route to the vortech unit should be asphalt and extend to the maintenance holes. The remaining reinforced grassed access routes, as illustrated, are sufficient.
    i. Is there to be access from Hawker Pvt?
c. Major flow route from Hawker Pvt into facility should be though a reinforced swale, in the same manner as illustrated from Wingover Pvt.
d. Install a second DIBC at the end of the facility over the stone drain or lower the invert of the outlet CSP to the bottom of the pond
e. Fully embed outlet weir into side slopes
    i. Reinforce shoulder and fall areas with blast rock and geotextile

6. East Facility
    a. Please provide cross-section through pond.
    b. The access route to the vortech unit should be asphalt. The remaining reinforced grassed access routes, as illustrated, are sufficient.
    c. Install a second DIBC at the end of the facility over the stone drain or lower the invert of the outlet CSP to the bottom of the pond
    d. Fully embed outlet weir into side slopes
        i. Reinforce shoulder and fall areas with blast rock and geotextile
7. Landscaping drawings were not provided
8. Clarification of administrative issues, as per previous submission, remain outstanding

Comments on Modelling:

- Overall I don't have an issue with the approach and modelling. Additional information, however, is required in the report.
- Page 19, section 4.4.4. More information on how the Major system was modelled is required. Has both static and dynamic depths been considered? Also, the report states that the 5 year flow is fully captured and that ponding occurs only during the 100 year event. Has this additional head on the ICD been considered in the 100 year event simulation? (i.e. HGL). The extent of ponding in the ROW should be shown on one of the drawings. (perhaps it is shown on a drawing, but it is not referenced in the report).
- A summary table of the depth of flow for each road segment should be provided in the report (if too large, the table can be in the appendix but referenced in the report).
- Page 20, section 4.4.5, As noted above, the capture rate should be greater during the 100 year event. Has this been accounted for in the HGL analysis. Also a summary table of the HGL vs USF should be provided. If the table is too large, then is should be included in the appendix. We should not have to hunt this information down in design spreadsheets.
- Page 24, section 5.3.3. How was the IA in SWMHYMO estimated. The City often recommends the use of the CN* method. What was used in this analysis?
- The above comments also apply to the East area and the business park area.
- Is the business park an Industrial area? If so, it will require a separate MOE approval for SWM.

If you have any questions, please call me at 580-2424 (Ext. 27824)

Sincerely,

Kevin Hall C.E.T.
Project Manager, Infrastructure Approvals
Development Review (Rural Services West)
Planning and Growth Management
Planning and Infrastructure
580-2424 ext. 27824

cc

Lisa Bowley

From: Hall, Kevin [Kevin.Hall@ottawa.ca]
Sent: Wednesday, August 22, 2012 9:47 AM
To: Susan Gordon
Subject: FW: 1500 Thomas Argue Road - Carp Airport Community - D07-16-10-0016

FYI

From: Tanner, Malcolm
Sent: July 24, 2012 12:13 PM
To: Hall, Kevin
Cc: Lecompte, Justine
Subject: 1500 Thomas Argue Road - Carp Airport Community - D07-16-10-0016

Kevin,

Comments regarding the plan/profile drawings provided for Carp Road with the proposed 200mm water main installation as follows:

1. Are the 2 chambers to be located on Rivington Street in Private or Public ownership ?
2. Where is the Remote Electronic Display mounting post to be located if the chambers are in the asphalt roadway ?
3. The deflection angles of the water main are not stated and the connection to the chamber is not acceptable at such a sharp angle and in conflict with the hydrant.
4. Municipal Approval circulation will be required once the water main design has been approved.
5. The final design should be reviewed/approved by Drinking Water Services.

A complete set of the revised drawing should be provided to me for reference.
I have cc'd Justine my comments to assist her in the preparation of the Licence of Occupation.

Malcolm

Malcolm Tanner, C.E.T.
Approvals Officer
Infrastructure Services Department
Business & Technical Services Branch
580-2424 ext. 27606
malcolm.tanner@ottawa.ca

Lisa Bowley

From: Hall, Kevin [Kevin.Hall@ottawa.ca]
Sent: Wednesday, August 22, 2012 9:48 AM
To: Susan Gordon
Subject: FW: Carp Airport - Licence of Occupation

FYI

From: Dover, Steve
Sent: August 16, 2012 12:15 PM
To: Hall, Kevin; McDonald, Shelley
Cc: Page, Danny; Tanner, Malcolm; Lecompte, Justine; Roy, Christopher; Surtees, Mark
Subject: RE: Carp Airport - Licence of Occupation

Hi Kevin,

We have reviewed the plans and provide the following:

1. The Badger turbine meter is not approved, consequently, cannot be installed. The water meter will be supplied and installed by the City at the developers expense complete with an ITRON RF Endpoint on a 6X6 post outside the meter chamber.
2. Complete a water card for this property so that we may properly size the water meter for both phase 1 & 2, Preliminary calculations indicate a 50 mm pd meter for phase 1 (0.45ML/Day) and a 75 mm turbine for phase 2 (1.46ML/Day).
3. Provide dimension for all items within the chambers.
4. The bypass valve in the meter chamber is to be sealed by City staff.
5. The throttle valve (flow control valve) is to have a valve on either side to allow for servicing/replacement. The valving must permit the servicing/replacement of the throttle valve and maintain flow and metering.
6. The delineation from City ownership to private ownership is to be the valve on the branch immediately south of the connection from the Rivington Street watermain.
7. Provide the horizontal clearance from the Rivington Street watermain and the proposed chambers. Provide the horizontal clearance from hydrant on Rivington Street to be removed and replaced from the proposed 200 mm private watermain.

Upon receipt of the completed water cards we can provide the meter sizing as well as template lengths.

Regards,

Steve Dover
Project Manager, Water Distribution
Environmental Engineering, City of Ottawa
951 Clyde Avenue, Ottawa, ON K1Z 5A6
Tel: (613) 580-2424 Ext.13613
Cell: (613) 266-3809
Fax: (613) 728-4183
e-mail: steve.dover@ottawa.ca

From: Hall, Kevin
Sent: July 25, 2012 2:19 PM
To: McDonald, Shelley
Cc: Page, Danny; Tanner, Malcolm; Lecompte, Justine; Dover, Steve
Subject: FW: Carp Airport - Licence of Occupation

Shelley

Development review has a subdivision application for the Carp Airport that is currently under review for construction. One of the unique features of the subdivision is that the site will be serviced by a private watermain connected to the Carp distribution system.

DRP needs input from the Drinking Water Services Branch regarding the layout of the pipes, valves, meter, and backflow prevention all enclosed in the two proposed chambers. Also DRP requires confirmation that the City requires that the watermain will be private from the connection point in Rivington Street down to the subdivision. I believe that there is a valve at Carp Road and Rivington Street. Would the City require another valve on Rivington Street east of the connection point.

I would appreciate a response as soon as you can since there is some pressure to move this file to completion.

Thanks

Kevin Hall C.E.T.
Project Manager, Infrastructure Approvals
Development Review (Rural Services West)
Planning and Growth Management
Planning and Infrstructure
City of Ottawa
4th Floor, 110 Laurier Ave.
MC. 01-14
(613) 580-2424 x27824
Kevin.Hall@ottawa.ca

From: Susan Gordon [mailto:s.gordon@novatech-eng.com]
Sent: July 17, 2012 10:46 AM
To: Hall, Kevin
Cc: Page, Danny; Ostafichuk, Jeffrey; Lecompte, Justine; 'jep@wcd.ca'; 'Jim McDermott'; John Riddell
Subject: Carp Airport - Licence of Occupation

Kevin,

Attached for your discussions with the legal department are a Memo (July 17, 2102) summarizing the watermain connection at Rivington and the drawings referenced in the memo, including connection details and the plan and profile drawings for the watermain on Carp Road.

Please let us know if you require prints of the drawings.

Susan M. Gordon, P.Eng.
****

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Lisa Bowley

From: Hall, Kevin [Kevin.Hall@ottawa.ca]
Sent: Wednesday, April 04, 2012 11:41 AM
To: Susan Gordon
Cc: Ostafichuk, Jeffrey
Subject: Carp Airport Second Submission

Susan

Here are comments on the second submission.

Working from the original list of comments

30. Since the City will be responsible for maintain the culverts we need the thickness indicated on the table. Also all the road crossing and City maintained culverts need to be indicated on the table. Some are missing or not labelled on the drawings. The culverts need to be labelled on the GP and GR plans. It takes too long to leaf through all the plan and profile drawings to find them.
38. I still need clarification on this item. are the water pipes going to run through the sewage treatment property to get to the Water treatment site. Also the pump station/lift station has been removed from the plans?
39. If the outlet from the sewage treatment plant is the roadside ditch then the effluent will cross in the neighbours property before ending up in Carp Creek. I think this goes back to the Legal outlet questions again.
40. I still don't think it is a good idea for the water to run to the end of the taxiway and turn right and turn right again to enter the storm pond. I think it would be a good idea to put this water in the storm pipe crossing under the ditch.
46. Not labelled
50. remove the "if required" for the abandoned ditch. I think since the ditch will not be in use any more, the developer should fill it in and not leave that for a site plan issue.
56. Comment applies to the taxiway cul-de-sac also.
58. Are both watermians installed in phase 1
66. Not addressed
67. More detailed grading to be provided. Pathway cross-section?
70. Label the new ditch and provide ditch slopes. Also a note should be added that the ditch is to be filled in.
87. Not addressed
98. Not addressed. We want a blown up area of the road and how the chamber fits into it.

Additional:

1. I appreciate addressing the comments on the reports in a response letter, but we need to see the updated reports.
2. Has a release rate been established from the Hanger lots. This is needed for the future site plan design of the lots.
3. The memo addressing the stormwater management comments provided a breakdown of the C-values but on the storm drainage area plan all the areas have a c-value of 0.5. Not all areas will be the same.
4. The SWM memo does not include the driveways in the hard surface calculations. This could bump the c-value to above 0.6.
5. I have not received full comments from MVC on the first submission. I have spoken to them and I expect to receive those comments by next week.
6. The proposed pump station should be identified in the servicing report. I am not looking to do an approval on it, but there should be some technical information provided for it.

The plans have been circulated to the SWM group and I expect comments from them in a week or so.

Please give me call if there are any points that need to be discussed.

Kevin Hall C.E.T.
Project Manager, Infrastructure Approvals
Development Review (Rural Services West)
Planning and Growth Management
Planning and Infrstructure
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4th Floor, 110 Laurier Ave.
MC. 01-14
(613) 580-2424 x27824
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MEMORANDUM

DATE: **MARCH 8, 2012** **BY HAND**

TO: **KEVIN HALL**

FROM: **BEN HOULE**

RE: **CARP AIRPORT: SERVICING DESIGN BRIEF REPORT REVISIONS**

CC: **JOHN PHILLIPS, JIM MCDERMOTT**
NOVATECH FILE #102085
CITY OF OTTAWA FILE #D07-16-10-0016

Kevin,

Further to your comments dated January 26, 2012, the following is submitted in response to comment #6 regarding the Servicing Design Brief (dated November 24, 2011).

The following chart summarizes the components of the proposed water system, the proposed design standard, jurisdiction and whether City review will be required:

Item	Description	Proposed Design Standard	Jurisdiction	City Review Required
1.	Materials – watermain, valves, hydrants	City of Ottawa	SDWA	Yes
2.	Cover	City of Ottawa	SDWA	Yes
3.	Valve spacing	City of Ottawa	SDWA	Yes
4.	Connection at Carp, including metering	City of Ottawa	City of Ottawa SDWA	Yes
5.	Water storage and pumping facility	MOE Guidelines	SDWA	No
6.	Fire protection/Fire Storage	Per discussion w. City of Ottawa Fire Department	City of Ottawa	Yes, by Fire Dept
7.	Fire hydrant spacing	City of Ottawa	SDWA	Yes, by Fire Dept

Based on your comments, this chart replaces the chart found in the Novatech letter dated October 28, 2011, which is attached in Appendix C of the Servicing Design Brief.

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Please be advised that the body of the Servicing Design Brief report dated November 24, 2011 will remain unchanged. A revised copy of the Servicing Design Brief will be submitted after the revised drawings have been approved.

Regards,

Ben Houle, E.I.T.

M:\2002\102085\DATA\MEMOS\20120308-SERVICING REVISIONS.DOC

MEMO / NOTE DE SERVICE

To / Destinataire	Susan Gordon P.Eng. Novatech Engineering	File/N° de fichier: D07-16-10-0016
From / Expéditeur	Kevin Hall C.E.T.	
Subject / Objet	Carp Airport Comments First Submission	Date: January 26, 2012

Susan

Here are City comments on the first submission of the engineering design for the Carp Airport.

General

1. Condition 28 requires that the stormwater report be circulated to the MTO. Has this been done and have comments been received?
2. What is happening to the existing ditch running through the park?
3. Site plan approval will be required for the sewage treatment and water storage buildings.
4. The clubhouse block is continually referred to as a Park block on the engineering drawings. This needs to be revised.
5. City will need a landscaping/street scraping plan to complete the review of the engineering drawings.

Servicing Report:

6. Change section 1.6. The City will be reviewing the water design to ensure conformance with City standards.
7. Confirm the spelling of Huisson Road. Spelled different in the report (1.6 and 2.5) and in the drawings.
8. Section 3.1.2. speaks to the proposed water system. It states that the watermain ranges in size from 50mm to 200mm. I think it should read 50mm to 300mm dia.
9. Provide information on the watercourse setbacks. Any water course setback should be indicated on the engineering drawings.

Hydraulic Network Analysis:

10. Provide the water pressures in the tables in KPa and PSI for ease of review.
11. Provide a drawing of the water system with the junctions, nodes and pipe numbers shown on it. Without this the tables can't be followed and reviewed.

Geotechnical Investigation:

12. Report needs to be updated with the final grade raise restrictions. This is stated in the report.
13. The geotech engineer must sign off on the grading plan. There may not be a need for this until we are closer to approval.

14. There is no mention of slope stability in the report. There are areas beside Carp Creek that the creek is 4-5m deep.

Storm Report:

15. Section 4.2.1 Please remove or revise. These lots are small enough that the whole lot will be disturbed during construction. I don't think this statement applies to these lots. Also this statement is made for the hanger lots and should be revisited
16. Update the descriptions of the east and west community's # of houses, hanger lot and towns due to the discussions of moving the townhouse block
17. Section 4.2.5 needs to be indicated/labelled better on the engineering drawings
18. Section 5 continually refers to street eight. From what I can see street eight is in the west community
19. Section 5.2.5 will there be infiltration trenches under the ditches of all taxiways or just Echo?
20. I can't review the storm sewer design sheets since the c – values are not on the post development plan. Also as per 5.4.5.2 calculate the runoff coefficient for a typical lot in the subdivision to justify the use of 0.5 in the design sheets.

Engineering Drawings

Phasing Plan:

21. The phasing plan indicates that only the storm sewers will be installed in street 4. Other engineering drawings don't reflect this. By looking at the general plans of service and grading plans it is difficult to decipher what portions of phase 2 will be constructed in phase 1.

Layout Plan:

22. How do people get to the Communal Hanger until Phase 2 is constructed?

GP1:

23. What is the purpose of the 200mm rear yard perforated pipes? The swale is steep enough that a subdrain is not required.
24. I don't see the need for a sewer in the rear of lots 8-20. Is the ditch in Street 6 deep enough for a pipe to outlet. A swale should work here.
25. The City does not want storm sewer running through their parks as proposed from street 6 through Block 279
26. How will access be granted and constructed for the City to access SWM pond 1 in the first phase?

GP2:

27. Label the watermain servicing lots 80-95
28. Would the Condo Group like to maintain the island in front of Lots 89-95? If not then the surface treatment will be hard surfacing with possibly riverstone and maybe some small shrubs. If the condo group maintains this feature they will have more flexibility on the design.
29. Typically Cul-de-sacs have a 50mm water loop and not a dead end water stub.
30. Label the culverts with size, length, type and thickness. A road crossing culvert table may be helpful.
31. Provide % slopes on all ditches.

32. Changes to the driveway layout will be required for some of the lots in the area of lots 89-95. Driveways should not cross a projected property line into the boulevard to the curb.
33. Due to the proposed driveway the house on lot 89 may need to be flipped.

GP3:

34. What is easement 1 for? Who is the easement in favour of? Better define the limits of the easement and any other proposed easements in the subdivision.
35. Is the sanitary sewer to be installed in both phases, or just phase 1.
36. Are the taxiways connected to the residential street? If not what kind of barrier will be installed.
37. How is the hanger lot to accessed by residents in phase 1?

GP4:

38. Water and sewer pipes going to the treatment plant and water facility are reversed.
39. Where is the proposed outlet from the sewage treatment plant?
40. Improve the ditch layout at the end of taxiway E. Maybe a ditch inlet CB should be installed where the ditch crosses the 825mm dia storm sewer.
41. Clean up the cluttered sewer information between lots 119 and 120.
42. 50mm watermain loop in cul-de-sac
43. If require by Parks provide servicing water, storm, sanitary and electrical services to the park.
44. Identify all easements of the plans

GP5:

45. Who maintains the McGee Pit ditch?
46. Label the McGee Pit ditch on the plan
47. Locate the 300mm watermain closer to the ditch to reduce any encumbrances' on future development.
48. Label Block 306
49. Remove possible future property lines from block 301 and 306
50. Label ditches to be abandoned.
51. Provide ditch slopes.
52. The proposed ditch diversions and relocation seem quite convoluted. Is it possible to merge the ditches into one?

GP6:

53. Ditch slopes
54. Improve the layout of the ditch crossing Taxiway Charlie Three.
55. Why is there only a ditch on one side of Taxiway Charlie Three?
56. Improve the layout of the ditching at the bend of Taxiway Charlie Three.
57. Would the proposed watermain be better situated in Huisson Road instead of the Taxiway? How will fire services have access to those hydrants?

GP7:

58. Shouldn't the 100mm dia watermain be 200mm? This is indicated on the plan and profile drawings also. Please confirm.

GP8:

59. It appears that the 300mm watermain along street 15 will service the future business lots and provide fire protection. Will there not be water quality concerns due to the length of time the water will be sitting in the main?
60. I know it is for a future phase but what is block 303 SWM pond supposed to service? Should block 303 be constructed as part of phase 1

Grading Plans

GR1:

61. Street 4 will need to be constructed to a certain standard to provide access to the swm pond.
62. I don't think block 278 is a park block. Please label correctly.
63. If Block 278 is not a park then I have issues with the overland flow route passing through it.
64. There is no grading information for the entrance off of Diamond view Road.

GR2:

65. Provide a more realistic house foot print and a hanger on the hanger lots.
66. Show the hanger driveways.
67. Provide grading on the pathways connecting the streets and taxiways.
68. Provide conceptual grading information on the hanger lots.

GR4:

69. Provide grading and drainage information for the park. This grading needs to tie into the elevations for Street 6.
70. What happens to the existing ditches and existing drainage in the area around the park.

GR5:

71. Remove conceptual building and non-existing property lines on blocks 306 and 301.
72. Remove the future road on block 306

GR6:

73. There appears to be two chainages on Taxiway Charlie 3. Very confusing.
74. Confirm the entrance to Helicopter Transport Services at the end of Huisson Road. There are two proposed culverts. Which one will be used.

GR9:

75. Is the proposed ditch to be constructed in Phase 1? Either way the alignement needs to be straightened.

Plan and Profile Drawings

P1:

76. Check the HGL at Lot 56. It appears to be a little close. Please confirm.

P2:

77. Indicate on the drawing what the type of fill will be used in areas where additional fill will be required over and above what is indicated in the cross-section for the road construction.
78. Also indicate the amount and type of fill over the arch culverts in relation to the recommendations of the Geotech engineer.

P7:

79. Grade raise concerns over the culvert installation.

P9:

80. Label the watermian size in street 8

P10:

81. 300mm cap is proposed for the end of the 200mm watermian.

P11:

82. I think adding a ditch inlet cb to the 825mm dia sewer would be the best for drainage in this area.

P17:

83. Label the two side streets to help orientate myself on the drawing.

P19:

84. Label the 825mm sewer in the plan view.
85. Show the 825mm sewer in the profile.
86. Is the perforated pipe in the taxiway part of the infiltration system as discussed in the stormwater report.

P20

87. Where do the ditches on Taxiway "D" outlet to?

P40

88. What is the shaded area? I assume it is the pulverized asphalt and new granular for shaping the road. Please add a note on the plan.

P50

89. Remove future road allowance. No approvals given for that in this draft plan approval.

P51:

90. Confirm the height of the hydrant. It appears to be lower than the road. I assume the back slope of the ditch is lower also.

P52:

91. Don't bend the ditch around the utility poles. Either relocate the poles or the ditch.

P53

92. Straighten the ditch to reduce future blockages or troubles.

P54

93. Ditch alignment
94. No ditch on one side of the taxiway.

P60:

95. Move the private watermain out of Thomas Argue Road and onto private property.

P63:

96. Label the back flow preventer

P65-68:

97. Label the watermin material on the drawings.
98. I may have to confirm with other City departments, but I don't think there is enough room for the connection, water meter and backflow chamber all on the north side of Carp River. I think it may be a good idea to move the chambers to the south side of the Carp River.

Notes and Tables:

99. Detail the separation distances between the water service and the septic tank. Are there any MOE requirements for this?
100. Are there any zoning setbacks for the septic tank in the front yard?

Details

D1:

101. The sanitary lateral is label as 175mm. I believe the diameter is 75mm.
102. Label the watermain in the urban x-section
103. Have these cross-section been circulated to the utilities? I want to make sure that the utilities and hydrants and street lights can all work together.
104. If this subdivision is in the Hydro Ottawa service area then the service trench and transformers will be located on private property in an easement. Will there be a need for greater setbacks for the house to ensure there is enough room for the septic tank.

D2:

105. If Taxiway C is not being constructed in phase one then I don't see the need for a cross-section on these drawings.

D5-6:

106. The creek crossing culverts on these drawings don't match with the Servicing, Grading and Plan and Profile drawings. The creek crossing drawings show one culvert where twin culverts are indicated elsewhere.

Comments from ROW Group:

1. A Municipal Approval circulation will be required for the reconstruction of Diamondview Road. (profiles P40, 41, 42)
2. A Municipal Approval circulation will be required for the water main installation in Carp Road. (profiles P65, 66, 67, 68)

3. Justification for the proposed east-to-west crossing point on Carp Road is requested.
4. A detailed drawing (possible scale of 1:100) of the water meter chambers located at Rivington Street is needed so as to determine possible impact on existing infrastructure/utilities.
5. The water main proposed to be in Thomas Argue Road should be relocated into the private property of the airport.

Comments on the Stormwater modelling review:

The report is very thorough and well presented. The modelling parameters are all in line with our guidelines, the methodology is very good and the results make sense. On page 24, table 5.5. Where do they get their allowable peak flow? It does not seem to correspond to table 5.3.

Stormwater Operations comments:

comments have been limited to perceived operation and maintenance aspect of the stormwater treatment facilities. Most comments relate to both facilities (east and west) since they are very similar in design. Comments related an aspect of a specific facility have been indicated as such.

East & West SWF:

1. Inlet(s)
    a. Storm Sewer Inlets:
        i. It appears standard headwall arrangements will be required
            - OPSD railings and debris grates as required
        ii. Additional energy dissipation of inlet flows may be required, please assess.
    b. Inlet Swales:
        i. Confirm swale slopes at facility
        ii. Specify construction details
        iii. Ensure adequate energy dissipation of inlet flows, if required
    c. Vortech Units:
        i. Please reduce the length of offset (5 m) from trunk SS if possible
        ii. Ensure adequate access and suitable work area for maintenance vehicles
    d. Major Flows
        i. Will all major flows to facilities be through the swale inlets?
2. Outlets
    a. Outlet Structures
        i. Ensure weirs are fully embedded within slopes
        ii. Reinforce slopes adjacent to weirs up to the top of grade
        iii. Ensure adequate fall protection (railings - post & rail will suffice) where required
    b. West Facility Outlet:
        i. Height of the top sill of outlet weir (113.25 m) is above 1:100 year level (112.54 m). Over-control?
    c. East Facility Outlet :
        i. Height of the top sill of outlet weir (112.15 m) is below 1:100 year level (112.69 m). Under-control?
    d. Outlet Swales
        i. General lack of details
        ii. Reinforce plunge area at facility outlet

e. Outlet Swale at Creek
    i. Ensure that swale entering the creek at a 90° angle will not cause erosion and/or modify
    ii. Verify slope of swale at creek
        - Reinforce swale slope at creek as required

3. Access
    a. General
        i. City will require unfettered vehicular access to vortech units and outlets
        ii. Unsure of potential issues regarding access adjacent to runway and/or taxiway – please clarify
        iii. Preferred access route should be dedicated to facility and away from any potential air traffic/taxiway routes
        iv. Reinforced grassed access road will suffice
        v. Suitable access controls may be required depending on nature of placement
4. Landscaping
    a. The report references plantings within the facilities to help mitigate temperature increases. We have concerns that plantings within the facility may reduce the lifespan of the infiltration trench, require maintenance and provide a source of debris that may foul the outlets.
        i. Please clarify
5. Administrative
    a. Please advise of any issues related to City assumption of facility
        i. Clarify timing of assumption – unclear within Subdivision Agreement (C68)
        ii. Clarify conditions regarding assumption
        iii. Please copy Stormwater & Municipal Drainage Unit upon receipt of Draft and Final MOE CofA documents.

Business Park:

1. While it is not envisioned that additional SWM facilities will be required for this stage of the development, please confirm operation/assumption status (City vs. private) of any potential SWM facilities.

If you have any questions, please call me at 580-2424 (Ext. 27824)

Sincerely,

Kevin Hall C.E.T.
Project Manager, Infrastructure Approvals
Development Review (Rural Services West)
Planning and Growth Management
Infrastructure Services and Community Sustainability

Ben Houle

From: McNaughton, Duncan [Duncan.McNaughton@ottawa.ca]
Sent: April 20, 2011 4:33 PM
To: c.sciuk@novatech-eng.com; Hutt, Paul
Cc: Susan Gordon
Subject: RE: Carp Airport Fire Flows

That is my take away from the meeting also.

Duncan McNaughton, P.Eng
Fire Protection Engineer
Ottawa Fire Services
613-580-2424 ext. 29603
613-978-0647 (cell)

From: Carl Sciuk [mailto:c.sciuk@novatech-eng.com]
Sent: April 20, 2011 16:06
To: Hutt, Paul; McNaughton, Duncan
Cc: 'Susan Gordon'
Subject: Carp Airport Fire Flows

Hi Paul/Duncan

Thanks again for meeting with us today. To summarize: We will utilize the 1,000usgpm for 30 minute fire flow for all buildings [residential and business/commercial], with the understanding that we will try to provide a charged non potable hydrant system [capable of delivering 1,000usgpm for 30min flow] to the business area. Our next step will be to discuss with city staff involved with water distribution approval to ensure we can put in appropriate backflow preventers to make this work & involve Paul/Duncan in discussions if we run into a roadblock.

Regards,

Carl Sciuk, P. Eng.
Senior Project Manager
Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6
Tel: (613) 254-9643
Fax: (613) 254-5867
http://www.novatech-eng.com

From: Carl Sciuk [mailto:c.sciuk@novatech-eng.com]
Sent: Wednesday, April 13, 2011 10:58 AM
To: 'Hutt, Paul'
Subject: RE: Carp Airport Fire Flows

Hi Paul, Great see you then. I would be happy to answer any questions beforehand.

Thanks

Carl Sciuk, P. Eng.
Senior Project Manager
::
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Tel: (613) 254-9643
Fax: (613) 254-5867
http://www.novatech-eng.com

From: Hutt, Paul [mailto:Paul.Hutt@ottawa.ca]
Sent: Wednesday, April 13, 2011 10:49 AM
To: c.sciuk@novatech-eng.com
Subject: Re: Carp Airport Fire Flows

Yes, Wednesday is the earliest. 9:00 am would work.
Thanks
Paul

From: Carl Sciuk <c.sciuk@novatech-eng.com>
To: Hutt, Paul
Sent: Wed Apr 13 10:39:17 2011
Subject: RE: Carp Airport Fire Flows

Hi Paul,
I am pretty open Mon, Tues & Wedn next week right now, so if Wednesday is earliest that works for you, it is good for me, please let me know your preferred time and I will book a room here,

Thanks,

Carl Sciuk, P. Eng.
Senior Project Manager
::
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From: Hutt, Paul [mailto:Paul.Hutt@ottawa.ca]
Sent: Wednesday, April 13, 2011 10:21 AM
To: c.sciuk@novatech-eng.com
Subject: Re: Carp Airport Fire Flows

Hi Carl
Thanks I have received your information. I was planning on inviting our Fire Engineer, but he isn't available on Friday. Would next week work? Wednesday? Please advise
Paul

----- Original Message -----
From: Carl Sciuk <c.sciuk@novatech-eng.com>
To: Hutt, Paul
Cc: 'Susan Gordon' <s.gordon@novatech-eng.com>
Sent: Wed Apr 13 09:18:19 2011
Subject: FW: Carp Airport Fire Flows

Hi Paul,

Another last minute job meeting came up Fri morning, would it be possible to move our meeting to either Fri afternoon or Thurs afternoon?

Please let me know,

Thanks,

Carl Sciuk, P. Eng.
Senior Project Manager
Novatech Engineering Consultants Ltd.
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Ottawa, Ontario
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-----Original Message-----
From: Carl Sciuk [mailto:c.sciuk@novatech-eng.com]
Sent: Tuesday, April 12, 2011 4:19 PM
To: 'Hutt, Paul'
Subject: RE: Carp Airport Fire Flows

Hi Paul

I have attached some information as discussed. Please feel free to give me a call as you are going through this information, I know it is a bit piecemeal and may lack info you need to provide feedback.

Thankyou,

Carl Sciuk, P. Eng.
Senior Project Manager
::
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Ottawa, Ontario
K2M 1P6
Tel: (613) 254-9643
Fax: (613) 254-5867

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-----Original Message-----
From: Hutt, Paul [mailto:Paul.Hutt@ottawa.ca]
Sent: Monday, April 11, 2011 11:23 AM
To: c.sciuk@novatech-eng.com
Subject: RE: Carp Airport Fire Flows

I'll see you on Friday at 9:00.
Thanks
Paul

-----Original Message-----
From: Carl Sciuk [mailto:c.sciuk@novatech-eng.com]
Sent: April 11, 2011 11:19
To: Hutt, Paul
Cc: 'Susan Gordon'
Subject: RE: Carp Airport Fire Flows

Thanks Paul, I will send you some information tomorrow, could we meet at our office Friday at 9am?

Carl Sciuk, P. Eng.
Senior Project Manager
::
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Fax: (613) 254-5867

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-----Original Message-----
From: Hutt, Paul [mailto:Paul.Hutt@ottawa.ca]
Sent: Monday, April 11, 2011 11:11 AM
To: c.sciuk@novatech-eng.com
Cc: Susan Gordon
Subject: RE: Carp Airport Fire Flows

Hi Carl
Currently I'm available on Thursday or Friday all day. If you could sent me

what you have, that would give me time to review. Thanks

-----Original Message-----
From: Carl Sciuk [mailto:c.sciuk@novatech-eng.com]
Sent: April 11, 2011 11:08
To: Hutt, Paul
Cc: 'Susan Gordon'
Subject: Carp Airport Fire Flows

Hi Paul

I am hoping to meet with you later in the week regarding fire fighting at Carp Airport as discussed last week. I could send you some preliminary information beforehand if you would like,

Please let me know what works for you,

Thanks,

Carl Sciuk, P. Eng.
Senior Project Manager
::
Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6
Tel: (613) 254-9643
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If you are not the intended recipient, please notify me at the telephone

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October 28, 2011

City of Ottawa
Planning and Growth Management Department
110 Laurier Avenue West
4th Floor
K1P 1J1

By E-mail

Attention: Danny Page

Dear Sir:

Re: Carp Airport Development – Proposed Water System
City of Ottawa
Our File: 102085

A meeting was held with the City of Ottawa on June 30, 2011 to discuss the proposed water system for the Carp Airport Development. The following provides the project background, a description of the proposed water system, a summary of the June meeting, the design standards being used and the responsibility for review.

The following drawings, presented and discussed at the meeting, are attached.

- Concept Plan 3
- Overall Watermain Layout Plan (102085-WMOL, rev.3)
- Meter and Connection Detail (102085-MC, Jun 2011)

Background

West Capital Developments, the owners of the Carp Airport lands, are proceeding towards registration of a subdivision and a common elements condominium for the property. Approval of the Draft Plan of Subdivision and Draft Plan of Condominium were granted by the City in August 2007 and were extended in November 2010.

The common elements include a communal water system which will bring water from the Village of Carp to the residential and business park areas within the development site. This City has agreed to provide maximum day flows, and has confirmed that there is currently sufficient capacity in the system to provide water for Phase 1 of the development (110 residential units and 200,000sq.ft. building area, or equivalent). Upgrades to the Carp water system proposed in the Village of Carp Class Environmental Assessment for Water and Wastewater Infrastructure Upgrade/Expansion (Stantec, May 2008) will provide sufficient water for the remainder of the development. Peak hour, fire flows and rechlorination will be provided by means of a water storage and pumping facility on site.

Under the Municipal Capital Facilities Agreement (MCFA) between the developer and the City of Ottawa, signed as a condition of purchase and sale, the common elements condominium will own, operate, monitor and maintain the following communal systems:

- sewage collection system
- sewage treatment plant
- watermain from Carp Village to site
- water storage facility and pumping facility
- water distribution system

Suite 200, 240 Michael Cowpland Dr., Ottawa ON K2M 1P6 Tel: (613) 254-9643 Fax: (613) 254-5867 www.novatech-eng.com

Under the MCFA, the condominium will own but the City will maintain all other components within the right of way (road surfaces, sidewalks, curbs, streetlights, storm sewers, ditches, etc.) as well as the stormwater management ponds.

Description of the Communal Water System

The communal water system will consist of the following, as illustrated on the Overall Watermain Layout Plan:

- 200mm watermain from Rivington Street in Carp to the site, carrying maximum day flow
- Storage to provide peak hour and a fire flow of 1000gal/min for 30 minutes
- Rechlorination as required
- Distribution to the residential areas and the serviced business park via 50 to 300mm diameter watermain
- Watermain to the unserviced business park to provide fire protection with backflow preventor
- Fire hydrants

Meeting with City of Ottawa (June 30, 2011)

The following is a summary of the meeting held to discuss the preliminary water system design. Representatives from the City of Ottawa Environmental Services Department, the City of Ottawa Planning and Growth Management Department, Novatech Engineering Consultants Ltd. and the developer attended.

- Concept Plan 3 was presented to provide an overview of the development project.
- The Overall Watermain Layout Plan and the Meter and Connection Detail were discussed. The City provided suggestions on the layout plan and technical comments on the detail.
- The system will be considered a private communal facility, starting with and including the meter/connection at Carp.
- The City will provide potable water to the connection, but will take no responsibility for the potability of the water after the connection. The City stated that the MOE would consider water downstream of the metering and connection chamber non-potable until it has been tested/monitored at the proposed water storage facility.
- The City attendees had no comments on the location of the watermain along the Carp Road, as the watermain is private, however they indicated that circulation with the City Right of Ways department will be required.
- The City will not provide future locates.
- The water system will be owned, operated, monitored and maintained by the condominium, who will in turn contract operation and maintenance to IDM, a licensed operator.
- The City will review and approve the metering/connection detail.
- The system will require its own Drinking Water Works permit number under the Safe Drinking Water Act (SDWA).

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Proposed Standards and Responsibility for Review

The chart below summarizes the components of the proposed water system, the proposed design standard, jurisdiction and whether City review would be required.

Item	Description	Proposed Design Standard	Jurisdiction	City Review Required
1.	Materials – watermain, valves, hydrants	City of Ottawa	SDWA	No
2.	Cover	City of Ottawa	SDWA	No
3.	Valve spacing	City of Ottawa	SDWA	No
4.	Connection at Carp, including metering	City of Ottawa	City of Ottawa SDWA	Yes
5.	Water storage and pumping facility	MOE Guidelines	SDWA	No
6.	Fire protection/Fire Storage	Per discussion w. City of Ottawa Fire Department	City of Ottawa	Yes, by Fire Dept
7.	Fire hydrant spacing	City of Ottawa	SDWA	Yes, by Fire Dept

Meter and Connection Detail:
The meter and connection detail will be forwarded to the City for review and approval to ensure that the metering system is designed to their satisfaction. Downstream of the connection will be a private system.

Fire Protection:
We met with the City of Ottawa fire department to discuss their requirements for fire protection, and they are satisfied with the proposal. The detailed design will be circulated to them for review and approval.

Safe Drinking Water Act:
The water system would be considered a regulated non-municipal drinking water system under the jurisdiction of the SDWA and would be designed in accordance with City of Ottawa or MOE standards as indicated in the chart above. Under the SDWA, the system will require written consent from the City of Ottawa and the condominium capital reserve fund would provide the financial assurance required by the SDWA. References from the SDWA are attached.

The MOE have confirmed that a Municipal Responsibility Agreement (MRA) for the communal sanitary sewage system will not be required, provided the system is owned by the Condominium Corporation and a properly funded reserve fund is established (see Minutes attached). Based on this approach, the City will be under no obligation to assume any responsibility for the sewage system, and therefore no financial assurance will be provided to the City and detailed review of the sanitary sewage system will not be completed by the City. By the same reasoning, financial assurance and detailed design review should not be required for the water system, as the Condominium Corporation, as owner, along with its reserve fund would satisfy the financial conditions that the City could impose under the SDWA.

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City Review:
The City has agreed that they will not be reviewing the sanitary collection and treatment system given that it is a private, condominium owned communal system under the jurisdiction of the MOE. The same reasoning would apply with respect to review of the water system which is a private, condominium owned communal system under the jurisdiction of the SDWA

We would appreciate your concurrence of the above, and please call to discuss should you have any questions.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

Susan M. Gordon, P.Eng.
Encl.

Cc: West Capital Developments Inc.

Suite 200, 240 Michael Cowpland Dr., Ottawa ON K2M 1P6 Tel: (613) 254-9643 Fax: (613) 254-5867 www.novatech-eng.com

Ben Houle

From: Leblanc, Patrick [Patrick.Leblanc@ottawa.ca]
Sent: October 19, 2007 1:36 PM
To: h.idstam@novatech-eng.com
Subject: Carp Rd. Boundary Conditions

Henrik: The following are revised boundary conditions, HGL, for hydraulic analysis at the corner of Carp and Rivington. The fireflow value applied was 6,000 lpm.

- Max_Day + FF = 156.0 m
- Peak_Hour = 160.0 m
- High Pressure Check = 161.0 m

These are for current conditions and are based on computer model simulation. *Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.*

Pat Leblanc, P.Eng.
Senior Water Resources Engineer
Infrastructure Services Branch
Transportation, Utilities & Public Works
City of Ottawa
(613) 580-2424 ext. 26708
(613) 560-6068 (fax)
patrick.leblanc@ottawa.ca

-----Original Message-----
From: Crowder, Murray
Sent: October 19, 2007 12:39 PM
To: Leblanc, Patrick
Subject: FW: Carp Village Watermain

Hi Pat,
We do not conduct full flow tests on hydrants in Carp. Would you be able to provide **Henrik Idstam** with flow/pressure data for Carp Rd at rivington.

Thanks,
Murray Crowder
City of Ottawa,Water Distribution
Technical Support, Drinking Water Services
951 Clyde Avenue, Ottawa, On K1Z 5A6
Mail Code 06-65
Tel: (613) 580-2424 x 22231
Fax: (613) 728-4183
e-mail: murray.crowder@ottawa.ca

-----Original Message-----
From: Hannewyk, Joseph B
Sent: October 16,2007 8:14 PM
To: Crowder, Murray
Subject: FW: Carp Village Watermain

fyi -----Original Message-----
From: Henrik Idstam [mailto:h.idstam@novatech-eng.com]
Sent: 2007/10/16 10:27
To: Hannewyk, Joseph B
Subject: Carp Village Watermain

Hi Joe,
Can you please provide flow information for the following hydrants in Carp Village:

- H064 (on Carp Road)
- H065 (on Rivington Street)

Together with the system pressure at these locations.
Thanks,
Henrik Idstam
Senior Designer
********** <blocked::http://www.novatech-eng.com/>
Novatech Engineering Consultants Ltd.
Suite 200, 240 Michael Cowpland Drive
Kanata . Ontario . Canada . K2M 1P6
Tel: (613) 254-9643 x205
Fax: (613) 254-5867
Email: h.idstam@novatech-eng.com <blocked::mailto:h.idstam@h.idstam@novatech-eng.com>
Web:

Pat Leblanc, P.Eng.
Senior Water Resources Engineer
Infrastructure Services Branch
Transportation, Utilities & Public Works
City of Ottawa
(613) 580-2424 ext. 26708
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Appendix C

EPANET

- EPANET Modelling Results
- EPANET Nodes
- EPANET Network Nodes Links

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MEMORANDUM

DATE: **FEBRUARY 21, 2012** **BY EMAIL**

TO: **KEVIN HALL**

FROM: **BEN HOULE**

RE: **CARP AIRPORT: HYDRAULIC NETWORK ANALYSIS REPORT REVISIONS**

CC: **JOHN PHILLIPS, JIM MCDERMOTT, SUSAN GORDON, CARL SCIUK, ANDREW VITATERNA, RICHARD PELLERIN**
NOVATECH FILE #102085
CITY OF OTTAWA FILE #D07-16-10-0016

Kevin,

Further to your comments dated January 26, 2012, the following is submitted in response to comments #10 and #11 regarding the Hydraulic Network Analysis.

Please find attached the following revised tables from Appendix A of the Hydraulic Network Analysis (dated November 21, 2011):

- Table A-2 – Scenario 1 – Supply main pressure from Carp
- Table A-3 – Scenario 2 – EPANET Results Max Day + Fire Residential
- Table A-4 – Scenario 3 – EPANET Results Fire Flow to Industrial
- Table A-5 – Scenario 4 – EPANET Results Peak Hour Flow to Industrial
- Table A-6 – Scenario 5 – Water Age

Also, please find attached the following figure from Appendix A:

- Figure A-1 – EPANET Nodes and Pipes

Please be advised that the body of the Hydraulic Network Analysis report dated November 21, 2011 remains unchanged.

Please provide your review and any changes that may be required.

Regards,

Ben Houle, E.I.T.

M:\2002\102085\DATA\MEMOS\20120221-HYDRAULIC REVISIONS.DOC

FIGURE A-1 EPANET NODES & PIPES

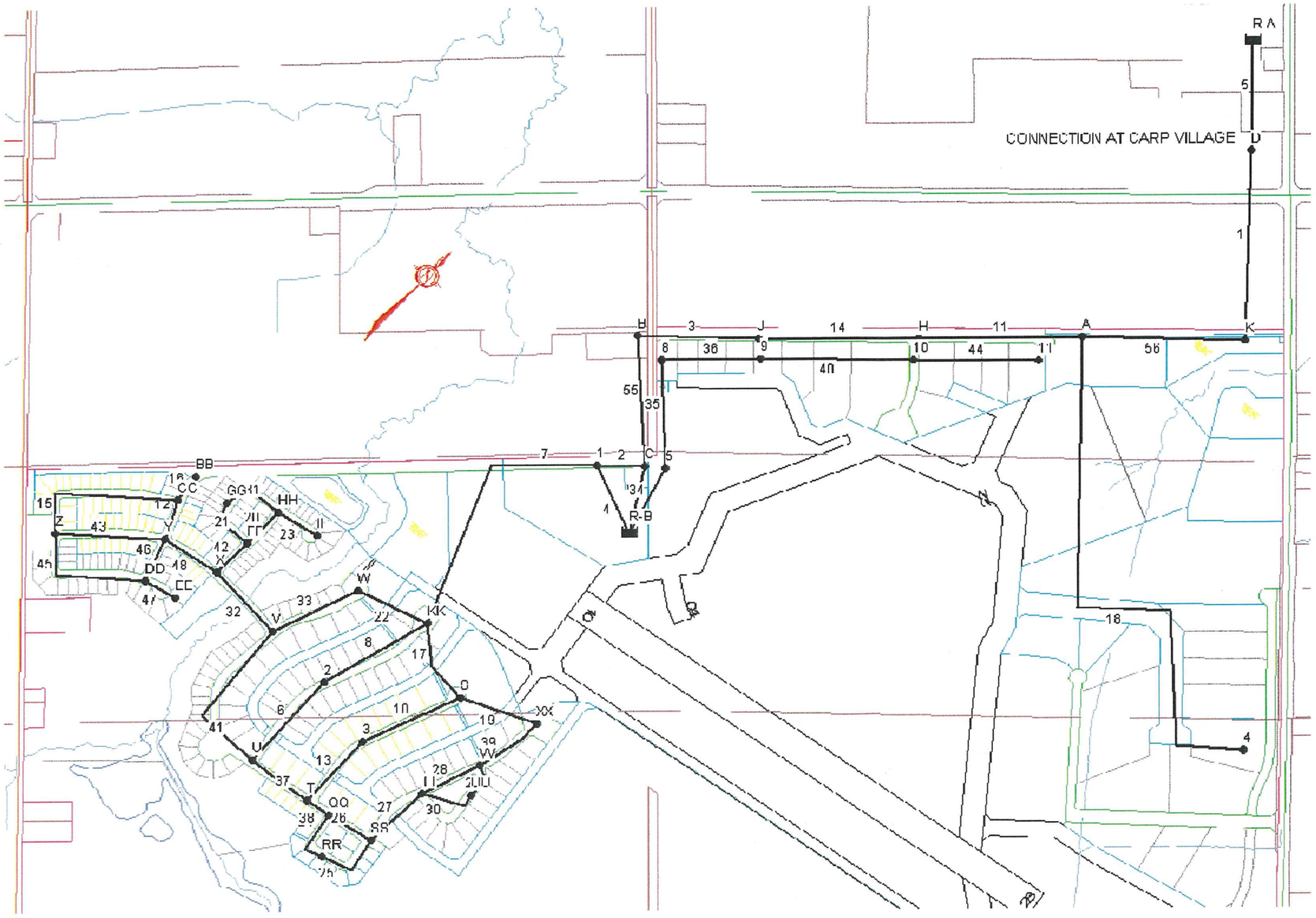


TABLE A -2
SCENARIO 1
SUPPLY MAIN PRESSURE FROM CARP

HEAD AT CARP VILLAGE CONNECTION= 156m
GRND ELEVATION AT WATER STORAGE= 112m

Epanet Flow [lps]	Epanet Elevation m	Epanet Total Head [m]	Epanet Pressure [m]	Losses at Meter Chamber[1] [m]	Net Pressure@ Storage Facility [m]	Net Pressure@ Storage Facility [KPa]	Net Pressure@ Storage Facility [psi]
0	112	156	44	5.6	38.4	375.8	54.5
5	112	155	43	5.6	37.4	366.0	53.1
10	112	154	42	5.6	36.4	356.2	51.7
15	112	151	39	5.6	33.4	326.9	47.4
20	112	148	36	5.6	30.4	297.5	43.2
25	112	143	31	5.6	25.4	248.5	36.1
30	112	138	26	5.6	20.4	199.5	29.0
35	112	133	21	5.6	15.4	150.6	21.9
40	112	126	14	5.6	8.4	82.0	11.9

Note [1] Includes head losses of meter and backflow preventer.

EPANET NODE OUTPUT FOR 40L/s

Node ID	Elevation [m]	Demand [lps]	Head [m]	Pressure [m]	Pressure [KPa]	Pressure [psi]
Junc D	94	0	156	62	607.2	88.1
Junc K	102	0	132.89	30.89	302.5	43.9
Junc A	106.5	0	127.69	21.19	207.5	30.1
Junc B	113	0	126.43	13.43	131.5	19.1
Junc J	110	0	126.71	16.71	163.7	23.8
Junc H	109	0	127.18	18.18	178.1	25.8
Junc C	112	40	125.98	13.98	136.9	19.9
Junc 4	106	0	127.69	21.69	212.4	30.8
Junc 5	112	0	150.32	38.32	375.3	54.5
Junc 8	113	0	150.32	37.32	365.5	53.1
Junc 9	110	0	150.32	40.32	394.9	57.3
Junc 10	109	0	150.32	41.32	404.7	58.7
Junc 11	109	0	150.32	41.32	404.7	58.7
Resvr R-A	156	-40	156	0	0.0	0.0
Resvr R-B	168	0	168	0	0.0	0.0

EPANET LINK OUTPUT FOR 40L/s

Link ID	Length [m]	Diameter [mm]	Roughness	Flow LPS	Velocity m/s	Unit Headloss m/km
Pipe 1	1998.27	200	110	40	1.27	11.56
Pipe 3	200	300	120	40	0.57	1.37
Pipe 14	350	300	120	-40	0.57	1.37
Pipe 49	450	200	110	-40	1.27	11.56
Pipe 5	1	300	150	40	0.57	0.9
Pipe 50	330	300	120	-40	0.57	1.37
Pipe 11	370	300	120	-40	0.57	1.37

TABLE A -3
EPANET RESULTS SCENARIO 2
MAX DAY + FIRE RESIDENTIAL

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure Kpa	Pressure psi
Junc S	118	0.43	153.75	35.75	350.1	50.8
Junc T	118	0.43	153.01	35.01	342.9	49.8
Junc QQ	118.5	0.43	153.04	34.54	338.3	49.1
Junc SS	118.5	0.43	153.06	34.56	338.5	49.1
Junc RR	118.5	0.43	153.05	34.55	338.4	49.1
Junc TT	118.5	0.43	153.21	34.71	340.0	49.3
Junc VV	118.5	0.43	153.26	34.76	340.4	49.4
Junc UU	118.5	0.43	153.23	34.73	340.2	49.4
Junc XX	118	0.43	153.43	35.43	347.0	50.4
Junc U	118	0.43	152.56	34.56	338.5	49.1
Junc V	116	0.43	148.1	32.1	314.4	45.6
Junc W	116	0.43	150.8	34.8	340.8	49.5
Junc X	116	0.43	141.95	25.95	254.2	36.9
Junc FF	115	0.43	141.93	26.93	263.8	38.3
Junc HH	115	0.43	141.93	26.93	263.8	38.3
Junc II	115	0.43	141.93	26.93	263.8	38.3
Junc GG	115	0.43	141.93	26.93	263.8	38.3
Junc Y	116	0.43	137.6	21.6	211.6	30.7
Junc Z	117	63.51	131.17	14.17	138.8	20.1
Junc DD	116	0.43	136.22	20.22	198.0	28.7
Junc EE	116	0.43	136.22	20.22	198.0	28.7
Junc KK	116	0.43	155.73	39.73	389.1	56.5
Junc CC	115	0.43	136.26	21.26	208.2	30.2
Junc BB	114	0.43	136.26	22.26	218.0	31.6
Junc C	112	0	159	47	460.3	66.8
Junc 1	112	0	158.96	46.96	459.9	66.8
Junc 2	118	0.43	154.02	36.02	352.8	51.2
Junc 3	118	0.43	153.58	35.58	348.5	50.6
Resvr R-B	159	-74.29	159	47	460.3	66.8

Link ID	Length m	Diameter mm	Roughnes	Flow LPS	Velocity m/s	Unit Headloss m/km
Pipe 7	750	300	120	74.29	1.05	4.3
Pipe 20	100	150	100	0.65	0.04	0.03
Pipe 21	90	150	100	0.64	0.04	0.03
Pipe 23	60	150	100	0.43	0.02	0.01
Pipe 24	100	150	100	-1.22	0.07	0.09
Pipe 25	100	150	100	-1.65	0.09	0.15
Pipe 26	110	150	100	2	0.11	0.22
Pipe 27	180	150	100	4.07	0.23	0.82
Pipe 28	130	150	100	-2.64	0.15	0.36
Pipe 29	100	150	100	2.3	0.13	0.28
Pipe 30	100	150	100	-1.87	0.11	0.19
Pipe 31	90	150	100	-0.21	0.01	0
Pipe 32	200	200	110	-67.82	2.16	30.74
Pipe 33	150	200	110	-50.8	1.62	18
Pipe 37	150	150	100	8.32	0.47	3.06
Pipe 38	60	150	100	-2.78	0.16	0.4
Pipe 39	130	150	100	-5.37	0.3	1.36
Pipe 41	370	150	100	17.45	0.99	12.05
Pipe 42	100	150	100	1.72	0.1	0.17
Pipe 43	240	150	100	26.87	1.52	26.81
Pipe 45	400	150	100	-17.9	1.01	12.64
Pipe 46	100	150	100	-18.77	1.06	13.79
Pipe 47	40	150	100	0.43	0.02	0.01
Pipe 48	150	200	110	-65.67	2.09	28.96
Pipe 12	90	150	100	-19.6	1.11	14.95
Pipe 15	370	150	100	-18.74	1.06	13.75
Pipe 16	50	150	100	0.43	0.02	0.01
Pipe 4	10	300	120	-74.29	1.05	4.3
Pipe 6	370	150	100	-9.56	0.54	3.95
Pipe 8	400	150	100	-9.99	0.57	4.29
Pipe 10	90	150	100	6.4	0.36	1.88
Pipe 13	340	150	100	-5.97	0.34	1.65
Pipe 17	300	150	100	12.63	0.71	6.63
Pipe 19	200	150	100	5.8	0.33	1.57
Pipe 22	270	200	110	-51.23	1.63	18.29

TABLE A -4
EPANET RESULTS SCENARIO 3
FIRE FLOW TO INDUSTRIAL

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure Kpa	Pressure psi
Junc A	106.5	0	164.01	57.51	563.3	81.8
Junc B	113	0	166.94	53.94	528.3	76.7
Junc J	110	0	166.3	56.3	551.4	80.0
Junc H	109	0	165.19	56.19	550.3	79.9
Junc C	112	0	167.98	55.98	548.3	79.6
Junc 4	106	63.1	161.66	55.66	545.1	79.1
Junc 5	112	0	150.32	38.32	375.3	54.5
Junc 8	113	0	150.32	37.32	365.5	53.1
Junc 9	110	0	150.32	40.32	394.9	57.3
Junc 10	109	0	150.32	41.32	404.7	58.7
Junc 11	109	0	150.32	41.32	404.7	58.7
Resvr R-B	168	-63.1	168	0	0.0	0.0

Link ID	Length m	Diameter mm	Roughness	Flow LPS
Pipe 3	200	300	120	-63.1
Pipe 14	350	300	120	63.1
Pipe 50	330	300	120	63.1
Pipe 9	5	300	120	-63.1
Pipe 11	370	300	120	63.1
Pipe 18	740	300	120	63.1

TABLE A -5
EPANET RESULTS SCENARIO 4
PEAK HOUR FLOW

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Unit Headloss m/km	Status
Pipe 7	750	300	120	25.74	0.6	Open
Pipe 20	100	150	100	1.68	0.16	Open
Pipe 21	90	150	100	1.67	0.16	Open
Pipe 23	60	150	100	1.12	0.07	Open
Pipe 24	100	150	100	1.53	0.13	Open
Pipe 25	100	150	100	0.41	0.01	Open
Pipe 26	110	150	100	-1.52	0.13	Open
Pipe 27	180	150	100	-0.81	0.04	Open
Pipe 28	130	150	100	-0.62	0.02	Open
Pipe 29	100	150	100	0.8	0.04	Open
Pipe 30	100	150	100	0.32	0.01	Open
Pipe 31	90	150	100	-0.55	0.02	Open
Pipe 32	200	200	110	-10.09	0.9	Open
Pipe 33	150	200	110	-12.26	1.29	Open
Pipe 37	150	150	100	-3.4	0.58	Open
Pipe 38	60	150	100	4.16	0.85	Open
Pipe 39	130	150	100	-2.53	0.34	Open
Pipe 41	370	150	100	-1.05	0.07	Open
Pipe 42	100	150	100	4.46	0.97	Open
Pipe 43	240	150	100	0.89	0.05	Open
Pipe 45	400	150	100	0.46	0.01	Open
Pipe 46	100	150	100	-1.77	0.17	Open
Pipe 47	40	150	100	1.12	0.07	Open
Pipe 48	150	200	110	-5.59	0.3	Open
Pipe 12	90	150	100	-1.81	0.18	Open
Pipe 15	370	150	100	0.42	0.01	Open
Pipe 16	50	150	100	1.12	0.07	Open
Pipe 2	*1*	*300*	*120*	*0*	*0*	*Closed*
Pipe 4	10	300	120	-25.74	0.6	Open
Pipe 6	370	150	100	-3.47	0.6	Open
Pipe 8	400	150	100	-4.58	1.01	Open
Pipe 10	90	150	100	2.99	0.46	Open
Pipe 13	340	150	100	-1.88	0.19	Open
Pipe 17	300	150	100	6.67	2.03	Open
Pipe 19	200	150	100	3.65	0.66	Open
Pipe 22	270	200	110	-13.37	1.52	Open
Pipe 34	20	150	100	20.4	16.1	Open
Pipe 35	300	150	100	20.4	16.1	Open
Pipe 36	200	150	100	19.4	14.67	Open
Pipe 40	300	150	100	10.2	4.46	Open
Pipe 44	300	150	100	1	0.06	Open

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure psi	
Junc S	118	0.03	146.93	28.93	41.1	
Junc T	118	1.12	146.82	28.82	41.0	
Junc QQ	118.5	1.12	146.77	28.27	40.2	
Junc SS	118.5	1.12	146.76	28.26	40.2	
Junc RR	118.5	1.12	146.76	28.26	40.2	
Junc TT	118.5	1.12	146.75	28.25	40.1	
Junc VV	118.5	1.12	146.76	28.26	40.2	
Junc UU	118.5	1.12	146.75	28.25	***40.1***	Min
Junc XX	118	1.12	146.8	28.8	40.9	
Junc U	118	1.12	146.91	28.91	41.1	
Junc V	116	1.12	146.94	30.94	44.0	
Junc W	116	1.12	147.13	31.13	44.2	
Junc X	116	0.04	146.76	30.76	43.7	
Junc FF	115	1.12	146.66	31.66	45.0	
Junc HH	115	1.12	146.64	31.64	45.0	
Junc II	115	1.12	146.64	31.64	45.0	
Junc GG	115	1.12	146.65	31.65	45.0	
Junc Y	116	1.12	146.71	30.71	43.6	
Junc Z	117	0.01	146.7	29.7	42.2	
Junc DD	116	1.12	146.69	30.69	43.6	
Junc EE	116	1.12	146.69	30.69	43.6	
Junc KK	116	1.12	147.54	31.54	***44.8***	Max
Junc CC	115	1.12	146.7	31.7	45.0	
Junc BB	114	1.12	146.69	32.69	46.5	
Junc 1	112	0	147.99	35.99	51.1	
Junc 2	118	1.12	147.14	29.14	41.4	
Junc 3	118	1.12	146.89	28.89	41.1	
Junc 5	112	0	147.68	35.68	50.7	
Junc 8	113	1	142.85	29.85	42.4	
Junc 9	110	9.2	139.92	29.92	42.5	
Junc 10	109	9.2	138.58	29.58	42.0	
Junc 11	109	1	138.56	29.56	42.0	
Resvr R-B	112	-46.14	***148***	36	51.2	

[Minimum Peak operating pressure is 148m]

Maximum Operating Pressure [zero flow]

Resr R-B water level	121	m
Junc 11	109	m
Max Press Junc 11	56	m
Max Supply Pressure	***165***	m [zero flow]

TABLE A -6
EPANET RESULTS SCENARIO 5
WATER AGE

Reservoir Daily Fill Rate [L/s]	Water Age from Carp [hrs]
0.5	91.9
0.6	76.6
0.7	65.7
0.9	51.1
1.3	35.4
1.8	25.6
2	23

Phase 1: 20 homes @ 1,166L/day, bleeding 0.1L/s at Node Z						
Node ID	Demand LPS	Head m	Pressure m	Pressure Kpa	Pressure psi	Age hours
Junc U	0.03	168	50	489.7	71.1	94.71
Junc V	0.03	168	52	509.3	73.9	59.12
Junc W	0.03	168	52	509.3	73.9	48.88
Junc X	0	168	52	509.3	73.9	66.17
Junc Y	0.03	168	52	509.3	73.9	71.47
Junc Z	0.13	168	51	499.5	72.5	93.93
Junc DD	0	168	52	509.3	73.9	81.95
Junc KK	0.03	168	52	509.3	73.9	39.75
Junc CC	0.03	168	53	519.1	75.3	76.02
Junc BB	0.03	168	54	528.9	76.8	83.23
Junc 1	0	168	56	548.5	79.6	0.52
Junc 2	0.03	168	50	489.7	71.1	62.38

Phase 1: 20 homes @ 540L/day, bleeding 0.3L/s at Node Z						
Node ID	Demand LPS	Head m	Pressure m	Pressure Kpa	Pressure psi	Age hours
Junc U	0.01	168	50	489.7	71.1	80.12
Junc V	0.01	168	52	509.3	73.9	55.71
Junc W	0.01	168	52	509.3	73.9	42.47
Junc X	0	168	52	509.3	73.9	59.78
Junc Y	0.01	168	52	509.3	73.9	62.82
Junc Z	0.31	168	51	499.5	72.5	78.09
Junc DD	0	168	52	509.3	73.9	67.31
Junc KK	0.01	168	52	509.3	73.9	35.1
Junc CC	0.01	168	53	519.1	75.3	65.97
Junc BB	0.01	168	54	528.9	76.8	80.59
Junc 1	0	168	56	548.5	79.6	0.46
Junc 2	0.01	168	50	489.7	71.1	56.63

TABLE A -7
EPANET RESULTS SCENARIO 6
PHASE 1 PEAK HOUR

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc D	94	0	156	62
Junc K	102	0	156	54
Junc A	106.5	0	156	49.5
Junc B	113	0	156	43
Junc J	110	0	156	46
Junc H	109	0	156	47
Junc S	118	0.34	167.89	49.89
Junc T	118	0	153.45	35.45
Junc QQ	118.5	0	156.55	38.05
Junc SS	118.5	0	156.55	38.05
Junc RR	118.5	0	156.55	38.05
Junc TT	118.5	0	159.64	41.14
Junc VV	118.5	0	161.71	43.21
Junc UU	118.5	0	160.68	42.18
Junc XX	118	0	164.8	46.8
Junc U	118	1.69	167.7	49.7
Junc V	116	1.69	167.71	51.71
Junc W	116	1.35	167.76	51.76
Junc X	116	0	167.68	51.68
Junc FF	115	0	167.68	52.68
Junc HH	115	0	167.68	52.68
Junc II	115	0	167.68	52.68
Junc GG	115	0	167.68	52.68
Junc Y	116	1.01	167.66	51.66
Junc Z	117	1.01	167.65	50.65
Junc DD	116	0	167.65	51.65
Junc EE	116	0	167.65	51.65
Junc KK	116	1.01	167.9	51.9
Junc CC	115	1.01	167.65	52.65
Junc BB	114	0.68	167.65	53.65
Junc C	112	0	156	44
Junc 1	112	0	168	56
Junc 2	118	1.69	167.73	49.73
Junc 3	118	0	153.45	35.45
Junc 4	106	0	156	50
Junc 5	112	0	150.32	38.32
Junc 8	113	0	150.32	37.32
Junc 9	110	0	150.32	40.32
Junc 10	109	0	150.32	41.32
Junc 11	109	0	150.32	41.32
Resvr R-A	156	0	156	0
Resvr R-B	168	-11.5	168	0

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Status
Pipe 1	1998.27	200	110	0	Open
Pipe 3	200	300	120	0	Open
Pipe 14	350	300	120	0	Open
Pipe 7	750	300	120	11.5	Open
Pipe 20	100	150	100	0	Closed
Pipe 21	90	150	100	0	Closed
Pipe 23	60	150	100	0	Closed
Pipe 24	100	150	100	0	Closed
Pipe 25	100	150	100	0	Closed
Pipe 26	110	150	100	0	Open
Pipe 27	180	150	100	0	Closed
Pipe 28	130	150	100	0	Closed
Pipe 29	100	150	100	0	Closed
Pipe 30	100	150	100	0	Closed
Pipe 31	90	150	100	0	Closed
Pipe 32	200	200	110	-3.72	Open
Pipe 33	150	200	110	-5.97	Open
Pipe 37	150	150	100	0	Closed
Pipe 38	60	150	100	0	Closed
Pipe 39	130	150	100	0	Closed
Pipe 41	370	150	100	-0.56	Open
Pipe 42	100	150	100	0	Closed
Pipe 43	240	150	100	1	Open
Pipe 45	400	150	100	0	Closed
Pipe 46	100	150	100	0	Closed
Pipe 47	40	150	100	0	Closed
Pipe 48	150	200	110	-3.72	Open
Pipe 49	450	200	110	0	Open
Pipe 5	1	300	150	0	Open
Pipe 12	90	150	100	-1.7	Open
Pipe 15	370	150	100	-0.01	Open
Pipe 16	50	150	100	0.68	Open
Pipe 50	330	300	120	0	Open
Pipe 2	1	300	120	0	Closed
Pipe 4	10	300	120	-11.5	Open
Pipe 6	370	150	100	-1.13	Open
Pipe 8	400	150	100	-2.82	Open
Pipe 9	5	300	120	0	Closed
Pipe 10	90	150	100	0	Closed
Pipe 13	340	150	100	0	Open
Pipe 17	300	150	100	0.34	Open
Pipe 19	200	150	100	0	Closed
Pipe 22	270	200	110	-7.32	Open
Pipe 11	370	300	120	0	Open
Pipe 18	740	300	120	0	Open
Pipe 34	20	150	100	0	Closed
Pipe 35	300	150	100	0	Open
Pipe 36	200	150	100	0	Open
Pipe 40	300	150	100	0	Open
Pipe 44	300	150	100	0	Open

TABLE A -8
EPANET RESULTS SCENARIO 7
PHASE 1 MAX DAY + FIRE

Node ID	Elevation m	Demand LPS	Head m	Pressure m
Junc S	118	0.15	165.21	47.21
Junc U	118	0.77	159.32	41.32
Junc V	116	0.77	156.92	40.92
Junc W	116	0.61	159.84	43.84
Junc Y	116	0.46	147.05	31.05
Junc Z	117	63.49	135.21	18.21
Junc KK	116	0.46	165.21	49.21
Junc CC	115	0.46	144.63	29.63
Junc BB	114	0.31	144.63	30.63
Junc 2	118	0.77	162	44
Resvr R-A	156	0	156	0
Resvr R-B	168	-68.3	168	0

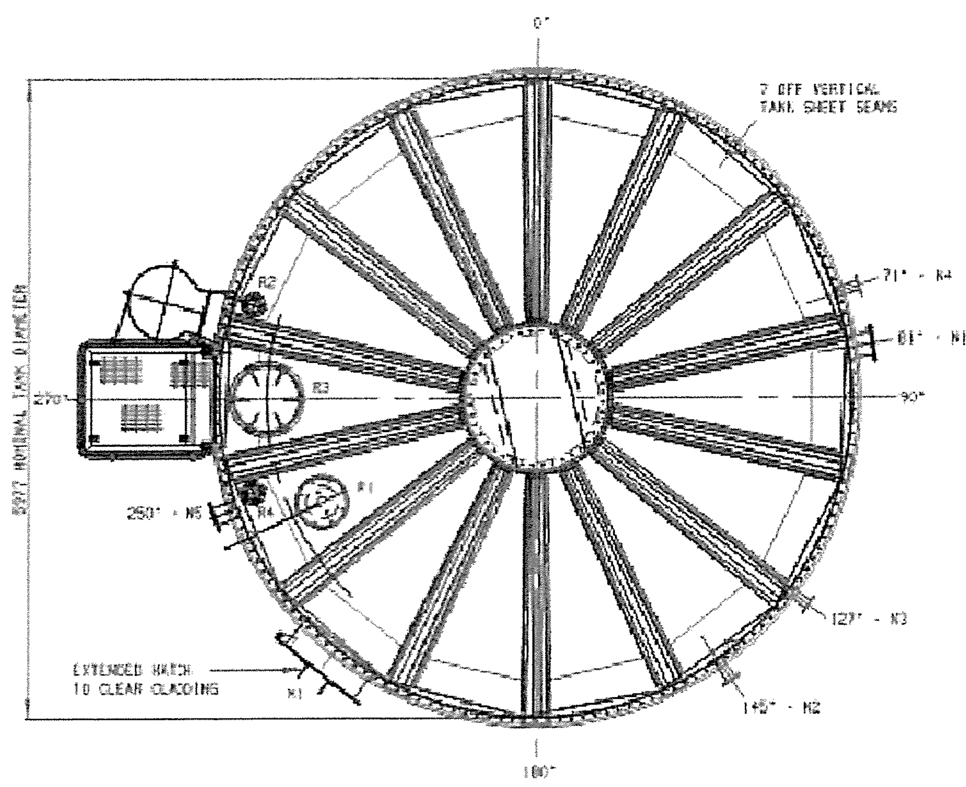
Link ID	Length m	Diameter mm	Roughness	Flow LPS	Status
Pipe 1	1998.27	200	110	0	Open
Pipe 3	200	300	120	0	Open
Pipe 14	350	300	120	0	Open
Pipe 7	750	300	120	68.3	Open
Pipe 20	100	150	100	0	Closed
Pipe 21	90	150	100	0	Closed
Pipe 23	60	150	100	0	Closed
Pipe 24	100	150	100	0	Closed
Pipe 25	100	150	100	0	Closed
Pipe 26	110	150	100	0	Open
Pipe 27	180	150	100	0	Closed
Pipe 28	130	150	100	0	Closed
Pipe 29	100	150	100	0	Closed
Pipe 30	100	150	100	0	Closed
Pipe 31	90	150	100	0	Closed
Pipe 32	200	200	110	-64.72	Open
Pipe 33	150	200	110	-53	Open
Pipe 37	150	150	100	0	Closed
Pipe 38	60	150	100	0	Closed
Pipe 39	130	150	100	0	Closed
Pipe 41	370	150	100	12.49	Open
Pipe 42	100	150	100	0	Closed
Pipe 43	240	150	100	37.36	Open
Pipe 45	400	150	100	0	Closed
Pipe 46	100	150	100	0	Closed
Pipe 47	40	150	100	0	Closed
Pipe 48	150	200	110	-64.72	Open
Pipe 49	450	200	110	0	Open
Pipe 5	1	300	150	0	Open
Pipe 12	90	150	100	-26.9	Open
Pipe 15	370	150	100	-26.14	Open
Pipe 16	50	150	100	0.31	Open
Pipe 50	330	300	120	0	Open
Pipe 2	1	300	120	0	Closed
Pipe 4	10	300	120	-68.3	Open
Pipe 6	370	150	100	-13.25	Open
Pipe 8	400	150	100	-14.02	Open
Pipe 9	5	300	120	0	Closed
Pipe 10	90	150	100	0	Closed
Pipe 13	340	150	100	0	Open
Pipe 17	300	150	100	0.15	Open
Pipe 19	200	150	100	0	Closed
Pipe 22	270	200	110	-53.61	Open
Pipe 11	370	300	120	0	Open
Pipe 18	740	300	120	0	Open
Pipe 34	20	150	100	0	Closed
Pipe 35	300	150	100	0	Open
Pipe 36	200	150	100	0	Open
Pipe 40	300	150	100	0	Open
Pipe 44	300	150	100	0	Open

Appendix D

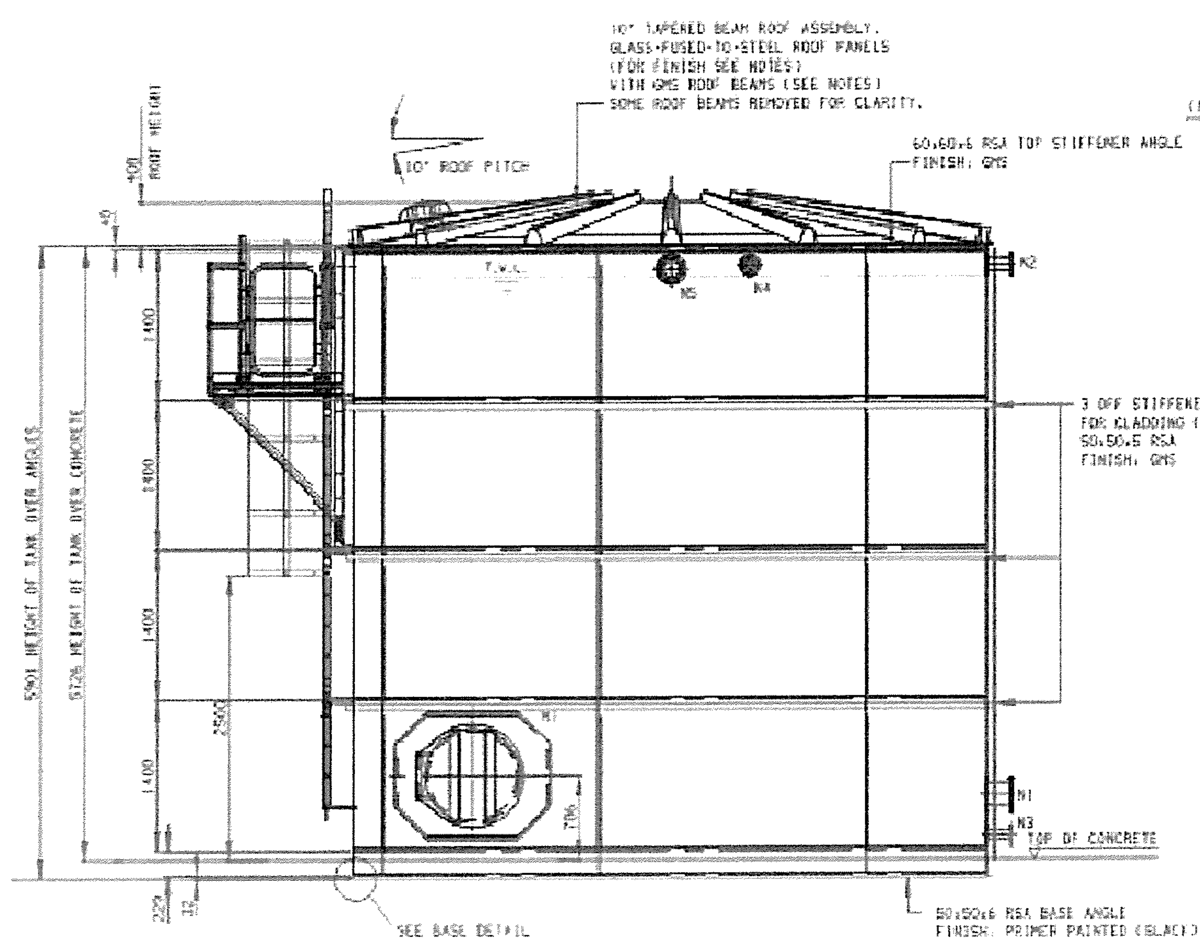
Miscellaneous Information

- Typical Water Storage Tank Details
- 6” Watts Series 709 Backflow Preventer
- Data Sheet

PART No 2869-1-1-SA



PLAN VIEW OF TANK



SIDE ELEVATION OF TANK - FOR TRUE ANGULAR ORIENTATIONS SEE PLAN VIEW

NOTES :

1. TANK AND ROOF EXTERNAL GLASSED COLOUR MUNSELL 5PB 2/4 BLUE.
   TANK AND ROOF INTERNAL GLASSED COLOUR MUNSELL 5G 2/2 BLUE/GREEN TRI-FUSION GRADE.
2. HOT DIPPED GALVANISED SPECIFICATION (GMS) TO BS EN ISO 1461 - 1999
3. TANK CONNECTIONS FLANGED TO ANSI ASA150 (BOLT HOLES OFF-CENTRE) UNLESS STATED OTHERWISE.
4. CLADDING SUPPLIED BY OTHERS
5. TANK DESIGN SUITABLE FOR UBC SEISMIC ZONE 3
6. CUSTOMER TO CONFIRM SUITABILITY OF ROOF CONNECTOR LENGTH TO ALLOW PROTRUSION THROUGH ROOF CLADDING.

PLATFORM DETAILS TO BS 5395
HANDRAIL SPECIFICATION TO BS.6180 : 1995
BUILDING USE CATEGORY 6A (0.36 kN/m² run)
WITH SAFETY GATE.
ALL STANCHION UPRIGHTS ARE 32NBx3.25mm THICK WALL MILD STEEL TUBE TO BS.1387 WITH A 75mm O/D BALL.
25NBx3.25mm THICK WALL MILD STEEL TUBE TO BS.1387 HANDRAILING.
100x6mm THICK MILD STEEL KICKSTRIP.
OPEN STEEL FLOORING 40/100 TYPE.
ALL FIXINGS ARE FINISHED SPUN GALVANISED.
LADDER TO BS 4211: 1994 CLASS A.

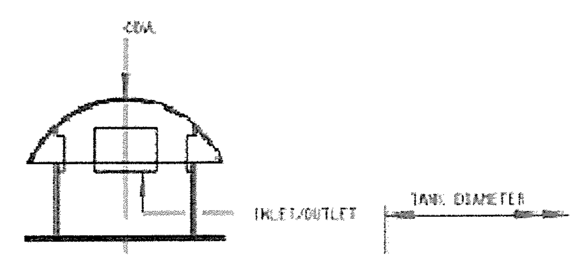
ITEM	TYPE	SIZE	DESCRIPTION	ORIENTATION	ELEVATIONS	FINISH
N1	SINGLE	8"NB (200mm)	OUTLET	81°	400	G.M.S
N2	SINGLE	4"NB (100mm)	RECIRCULATION LINE	145°	5536	G.M.S
N3	SINGLE	3"NB (80mm)	DRAIN	127°	222	G.M.S
N4	SINGLE	3"NB (80mm)	INLET	71°	5536	G.M.S
N5	SINGLE	6"NB (150mm)	OVERFLOW	250°	5503	G.M.S
M1	--	ø31" (800mm)	MANWAY	219°	7064	G.M.S

ITEM	TYPE	SIZE	DESCRIPTION	ORIENTATION	RADIUS	FINISH
R1	--	12"NB (300mm)	VENT	244°	R 2232	G.R.P
R2	SINGLE	4"NB (100mm)	FLANGE	288°	R 2800	G.M.S
R3	--	ø24" (610mm)	INSP. HATCH	270°	R 2533	G.M.S
R4	SINGLE	4"NB (100mm)	FLANGE	252°	R 2800	G.M.S

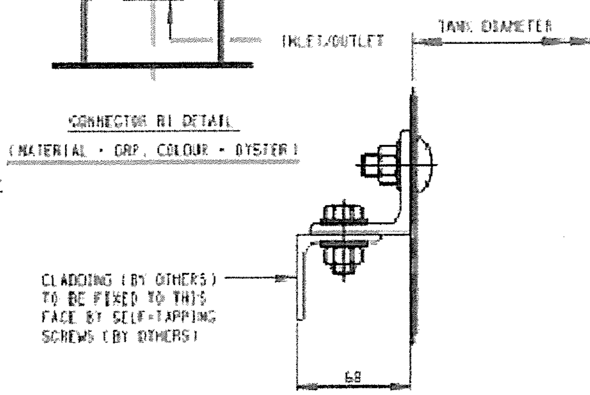
CONNECTION N5 REQUESTED AT 145 BELOW TOP OF TANK
MOVED TO 222 BELOW TOP OF TANK 5503 ABOVE BASE GIVING 300 FREEBOARD.

CONNECTIONS N2 AND N4 REQUESTED AT 260 BELOW TOP OF TANK
MOVED TO 190 BELOW TOP OF TANK 5536 ABOVE BASE TO BE ABOVE TOP WATER LEVEL

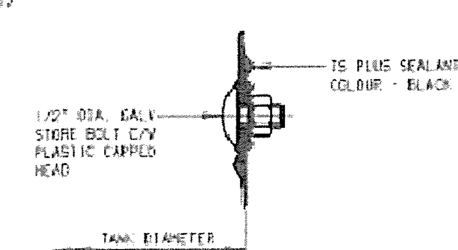
CONNECTION N3 REQUESTED AT 145 ABOVE BASE MOVED TO 222 ABOVE BASE
TO AVOID HORIZONTAL SEAM



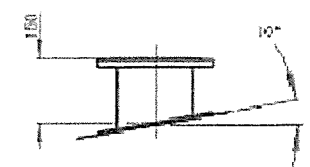
CONNECTOR R1 DETAIL
(MATERIAL - GRP, COLOUR - OYSTER)



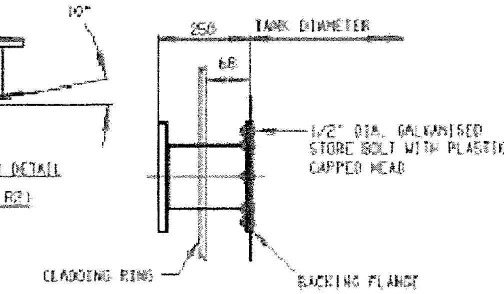
SCRAP SECTION THRO' STIFFENER ANGLE



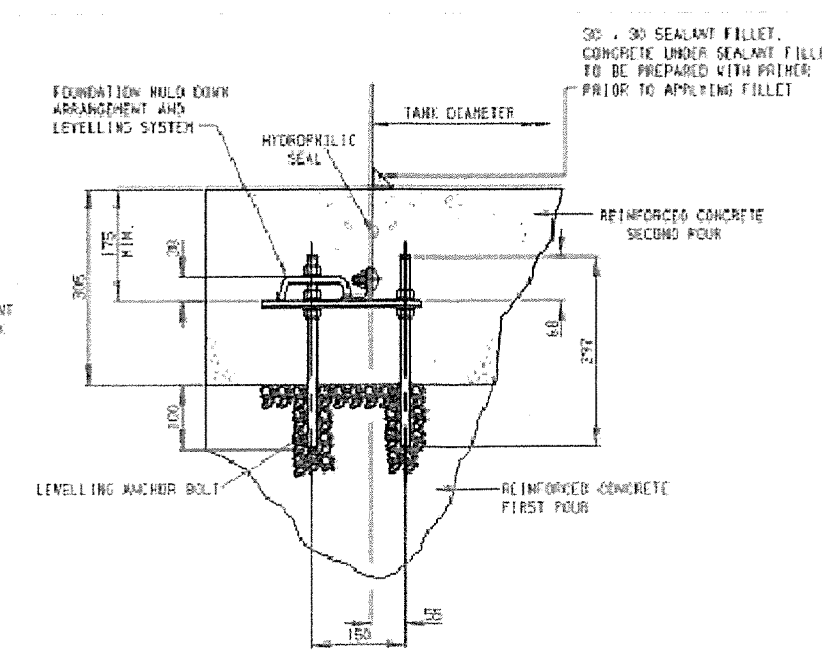
ENLARGED SECTION THROUGH HORIZONTAL / VERTICAL SHEET JOINT



ROOF CONNECTOR DETAIL
(CONNECTOR R2)



SINGLE FLANGED CONNECTOR DETAIL (TYP)



BASE DETAIL

CAD DRAWING - NO MANUAL ALTERATIONS PERMITTED

DRAWN W.R.	DATE 7 Sep 2006	MATERIAL --	TYPICAL WATER STORAGE TANK
SCALE .03	CHECKED	MATERIAL SPEC --	DETAILS
ISSUED	DWG No	FINISH --	
THIRD ANGLE PROJECTION			FIGURE D-1

For Non-Health Hazard Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

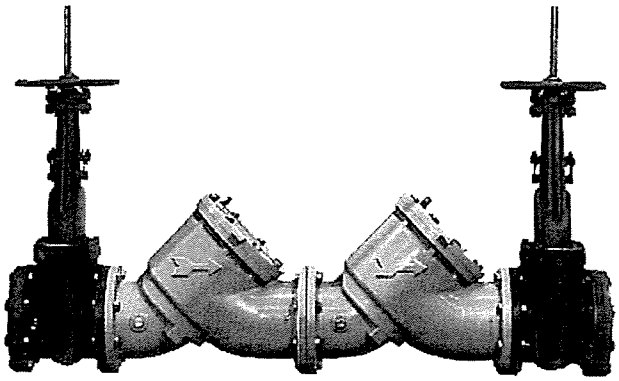
Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

Series 709
Double Check Valve Assemblies

Sizes: 2½" – 10" (65 – 250mm)

Series 709 Double Check Valve Assemblies are designed to prevent the reverse flow of polluted water from entering into the potable water system. This series can be applied, where approved by the local authority having jurisdiction, on non-health hazard installations. Series 709 features a modular check design concept to facilitate easy maintenance. Check with local jurisdictional authority as to installation requirements.



709 OSY

Features

- Replaceable bronze seats
- Maximum flow at low pressure drop
- Design simplicity for easy maintenance
- No special tools required for servicing
- Captured spring assemblies for safety
- Approved for vertical flow up installation

Models

Suffix:

NRS – non-rising stem resilient seated gate valves

OSY – UL/FM outside stem and yoke resilient seated gate valves

S-FDA – FDA epoxy coated strainer

BB – bronze body - 2½" – 3" (64 – 76mm)

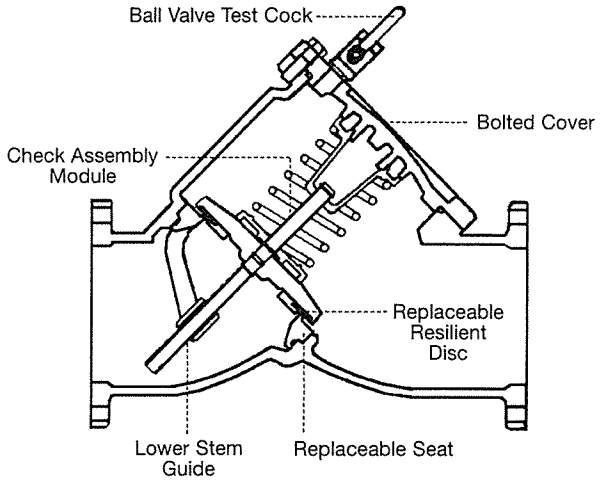
QT – quarter-turn ball valves

QT-FDA – FDA epoxy coated ball valve shutoffs

LF – without shutoff valves

Specifications

A Double Check Valve Assembly shall be installed at referenced cross-connections to prevent the backflow of polluted water into the potable water supply. The cross-connections shall be determined by local inspection authority for use where a high hazard situation does not exist. Valve shall feature modular check assemblies with center stem guiding. Each check module shall have a captured spring and be accessible through a bolted cover plate. Seats shall be replaceable without special tools. It shall be a complete assembly including tight-closing resilient seated shutoff valves, test cocks, and a strainer is recommended. The assembly shall meet the requirements of ASSE No. 1015; AWWA C510-92; CSA B64.5 and UL Classified File No. EX3185. Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Assembly shall be a Watts Regulator Company Series 709.



Check Assembly Module

Series 709 features a modular design concept which facilitates complete maintenance and assembly by retaining the spring load. Also, the first and second check module are identical and can be interchanged.

IMPORTANT: *INQUIRE WITH GOVERNING AUTHORITIES FOR LOCAL INSTALLATION REQUIREMENTS*

Now Available
WattsBox Insulated Enclosures.
For more information, send for literature ES-WB.

WATTS®

Materials

Check Valve Bodies: Epoxy coated cast iron
Seats: Bronze

Pressure — Temperature

Temperatures Range: 33°F – 110°F (0.5°C – 43°C) continuous, 140°F (60°C) intermittent

Maximum Working Pressure: 175psi (12.1 bar)

Standards

AWWA C510-92
IAPMO PA 31
USC Manual for Cross-Connection Control, 8th Edition

Approvals

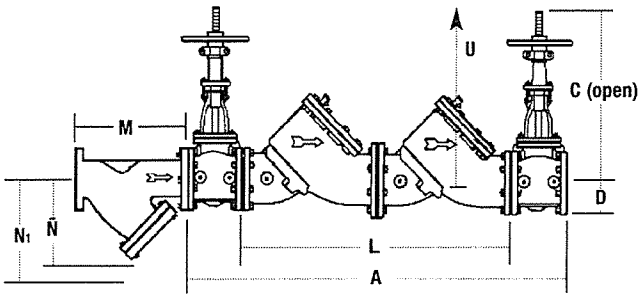
1015 B64.5

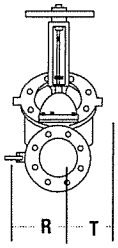
Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California. Sizes 4" – 10" (100 – 250mm) approved horizontal and vertical "flow up". Size 2½" and 3" (65 – 80mm) approved horizontal only.

Factory Mutual approved 4" – 10" (80 – 250mm) vertical "flow up" with OSY gate valves only.

Note: Model "S" not listed

Dimensions — Weights





SIZE (DN)		DIMENSIONS															
		A		C (OSY)		C (NRS)		D		L		U*		M		N	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
2½	65	39⅜	1000	16⅜	416	9⅜	238	3½	89	24⅛	613	11	279	10	254	6½	165
3	80	40⅜	1025	18⅞	479	10¼	260	3¾	95	24⅛	613	14	356	10⅛	257	7	178
4	100	52⅜	1330	22¾	578	12 3/16	310	4½	114	34⅛	867	14	356	12⅛	308	8¼	210
6	150	62⅞	1597	30⅛	765	16	406	5½	140	41⅝	1057	16	406	18½	470	13½	343
8	200	75	1905	37¾	959	19 15/16	506	6½	165	52	1321	21	533	21⅝	549	15½	394
10	250	90	2286	45¾	1162	23 13/16	605	8	203	64	1626	25	635	26	660	18½	470

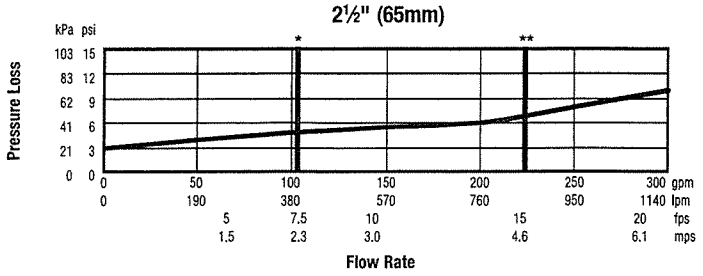
SIZE (DN)		DIMENSIONS								WEIGHT						STRAINER	
		N1†		R		R❖		T		NRS		OSY		QT		Weight	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.	lbs.	kgs.
2½	65	10	254	4	102	16	406	3	76	167	76	170	77	154	70	28	13
3	80	10	254	5	127	16	406	3	76	167	76	170	77	162	73	34	15
4	100	12	305	6	152	19¾	502	6	152	368	167	383	174	275	125	60	27
6	150	20	508	11	279	26	660	7½	191	627	284	707	321	611	277	122	55
8	200	22¾	578	11¼	286	11¼	286	9	229	1201	545	1307	593	1419	644	247	112
10	250	28	711	12½	318	12½	318	10¼	260	2003	909	2073	940	2466	1119	370	168

† - Dimension required for screen removal. ❖Quarter-turn (QT) valve dimensions.
*Service clearance for check assembly from center.

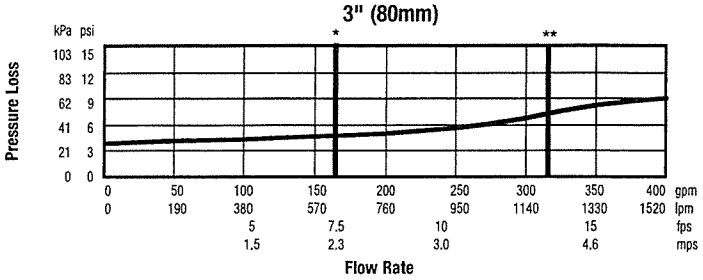
Capacity

*Typical maximum system flow rate (7.5 feet/sec.) **UL rated flow

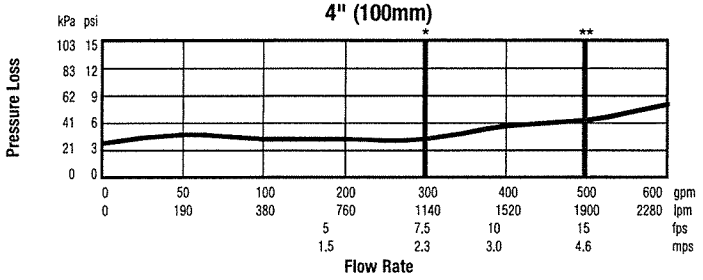
2½" (65mm)



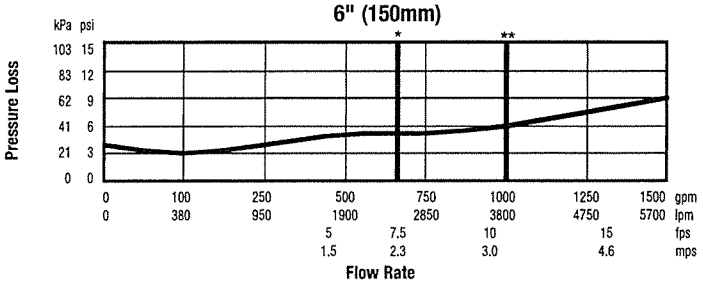
3" (80mm)



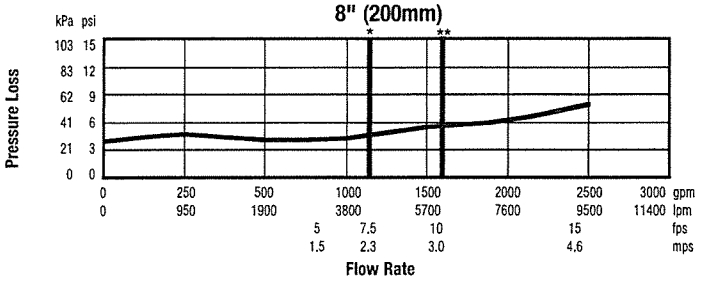
4" (100mm)



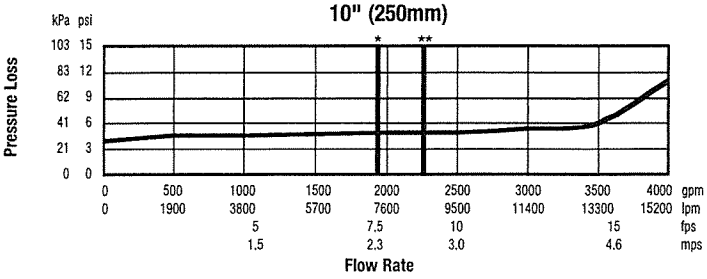
6" (150mm)



8" (200mm)



10" (250mm)



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NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

No.	REVISION	DATE	BY
8.	ISSUED FOR PHASE 1 RESIDENTIAL REGISTRATION	NOV 5/14	DJC
7.	REVISED PER CITY / MVC COMMENTS	SEPT 26 / 13	DJC
6.	ISSUED WITH HYDRAULIC ANALYSIS REPORT	MAY 28/13	DJC
5.	ISSUED FOR DISCUSSION	JUN 14/12	DJC
4.	ISSUED WITH HYDRAULIC ANALYSIS REPORT	NOV 21/11	DJC
3.	ISSUED TO CITY OF OTTAWA FOR DISCUSSION	JUN 28/11	DJC
2.	ISSUED FOR DISCUSSION	MAY 3/11	LW
2.	ISSUED FOR DISCUSSION	APR 12/11	DJC
1.	ISSUED FOR DISCUSSION	APR 7/11	DJC

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DESIGN CJS
CHECKED SMG
DRAWN DJC
CHECKED SMG
APPROVED SMG

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REGISTERED PROFESSIONAL ENGINEER
C.J. SCIUK
NOV 13 2014
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
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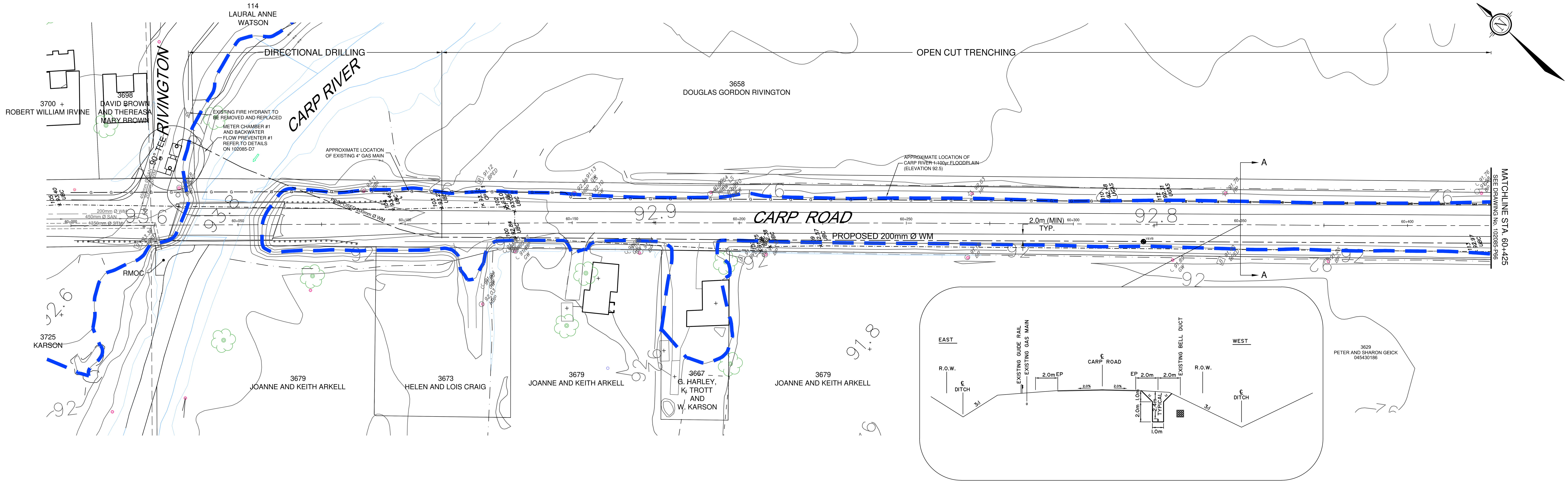
Facsimile (613) 254-5867
Website www.novatech-eng.com

CITY OF OTTAWA
WEST CAPITAL AIRPARK

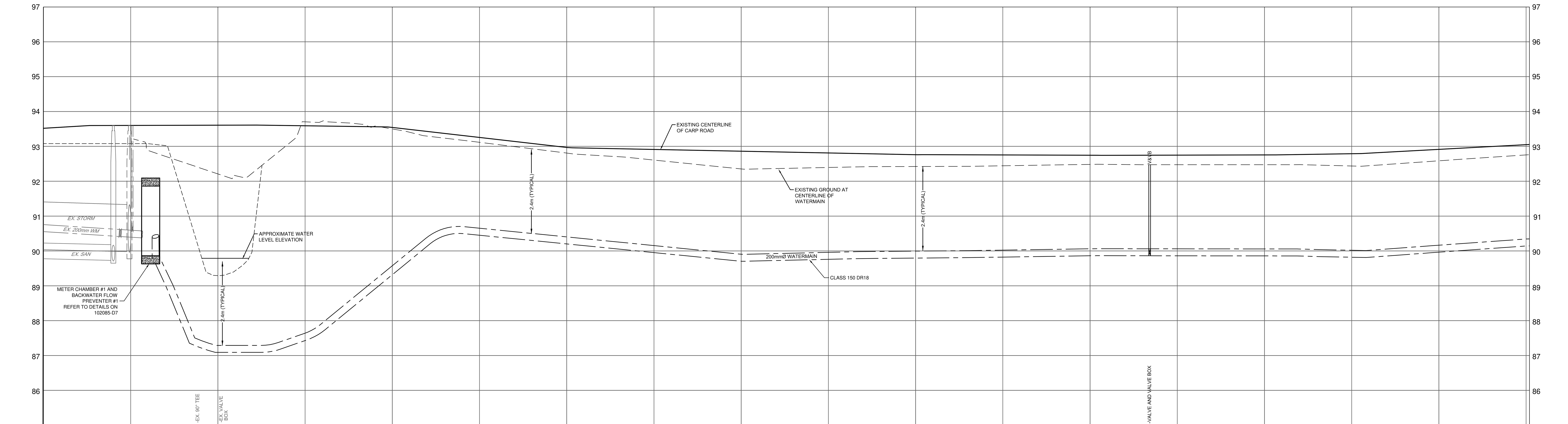
OVERALL WATERMAIN
LAYOUT PLAN

PROJECT No. 102085-01
REV
REV # 8
DRAWING No.
102085-WMOL

PLANB1.DWG - 1000mmx707mm



CROSS SECTION CARP ROAD A-A
10+350
N.T.S.



CHAINAGE	EXISTING CL ROAD ELEV.	EXISTING ELEV. AT CL WM	TOP OF WM ELEVATION
60+025	93.60		
60+028.3			90.58
60+029.66			90.58
60+039.47			88.86
60+050	93.61	89.29	87.29
60+057.17			87.30
60+061.59			87.30
60+075	93.59	93.70	87.64
60+100	93.54	93.50	89.58
60+125	93.26	93.12	90.65
60+150	92.97	92.81	90.40
60+175	92.91	92.61	90.15
60+195			89.90
60+200	92.86	92.35	89.91
60+225	92.81	92.39	89.96
60+250	92.76	92.42	90.00
60+275	92.75	92.44	90.03
60+300	92.74	92.48	90.06
60+317			90.07
60+325	92.75	92.47	90.06
60+350	92.75	92.47	90.06
60+375	92.79	92.44	90.02
60+400	92.91	92.59	90.16
60+425	93.05	92.75	90.34

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WEST CAPITAL Developments

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3.	ISSUED TO THE CITY OF OTTAWA	JUL 17/12	DJC
2.	REVISED AS PER CITY COMMENTS	MAR 8/12	DJC
1.	ISSUED FOR REVIEW	NOV 21/11	DJC

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DESIGN CJS
CHECKED SMG
DRAWN DJC
CHECKED LAB
APPROVED JGR

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J.G. RIDDELL
13/11/14
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CITY OF OTTAWA
WEST CAPTIAL AIRPARK

PLAN AND PROFILE OF
CARP ROAD
STATION 60+000 TO 60+425

PROJECT No. 102085-01
REV REV # 6
DRAWING No. 102085-P65

PLANB1.DWG - 1000mmx707mm

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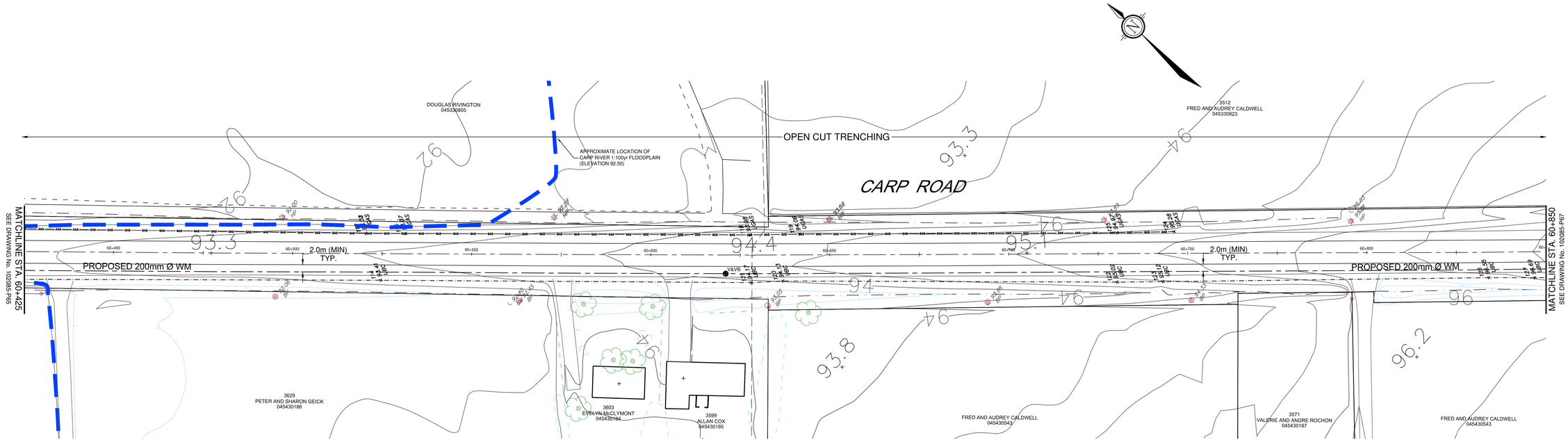

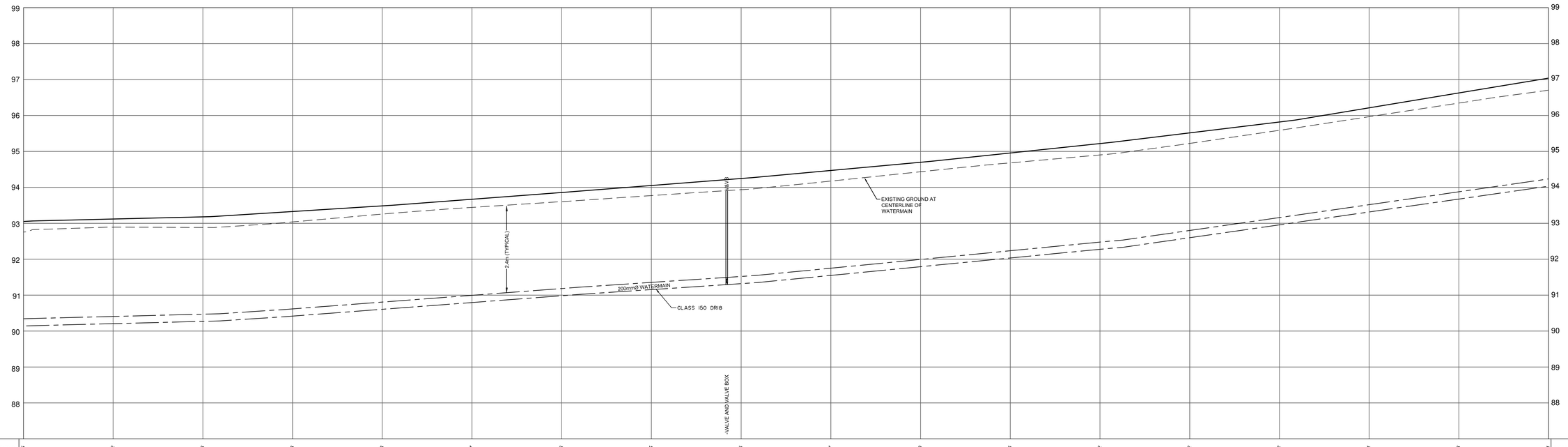

EXISTING CL ROAD ELEV.	93.05	93.12	93.18	93.33	93.48	93.67	93.86	94.05	94.25	94.47	94.70	94.96	95.22	95.52	95.82	96.21	96.63	97.04						EXISTING CL ROAD ELEV.
EXISTING ELEV. AT CL WM	92.75	92.89	92.88	93.04	93.26	93.44	93.60	93.77	93.93	94.17	94.43	94.68	94.90	95.22	95.59	95.97	96.35	96.70						EXISTING ELEV. AT CL WM
TOP OF WM ELEVATION	90.34	90.41	90.47	90.62	90.81	90.99	91.18	91.35	91.50	91.52	91.75	91.99	92.23	92.48	92.82	93.16	93.52	93.88	94.23					TOP OF WM ELEVATION
CHAINAGE	60+425	60+450	60+475	60+500	60+525	60+550	60+575	60+600	60+621	60+625	60+650	60+675	60+700	60+725	60+750	60+775	60+800	60+825	60+850					CHAINAGE

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2.	REVISED AS PER CITY COMMENTS	MAR 8/12	DJC
1.	ISSUED FOR REVIEW	NOV 21/11	DJC

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HORIZONTAL
1:50
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VERTICAL

DESIGN: CJS
CHECKED: SMG
DRAWN: DJC
CHECKED: LAB
APPROVED: JGR

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J.G. RIDDELL
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CITY OF OTTAWA
WEST CAPITAL AIRPARK

PLAN AND PROFILE OF
CARP ROAD
STATION 60+425 TO 60+850

PROJECT No. 102085-01
REV REV # 6
DRAWING No. 102085-P66

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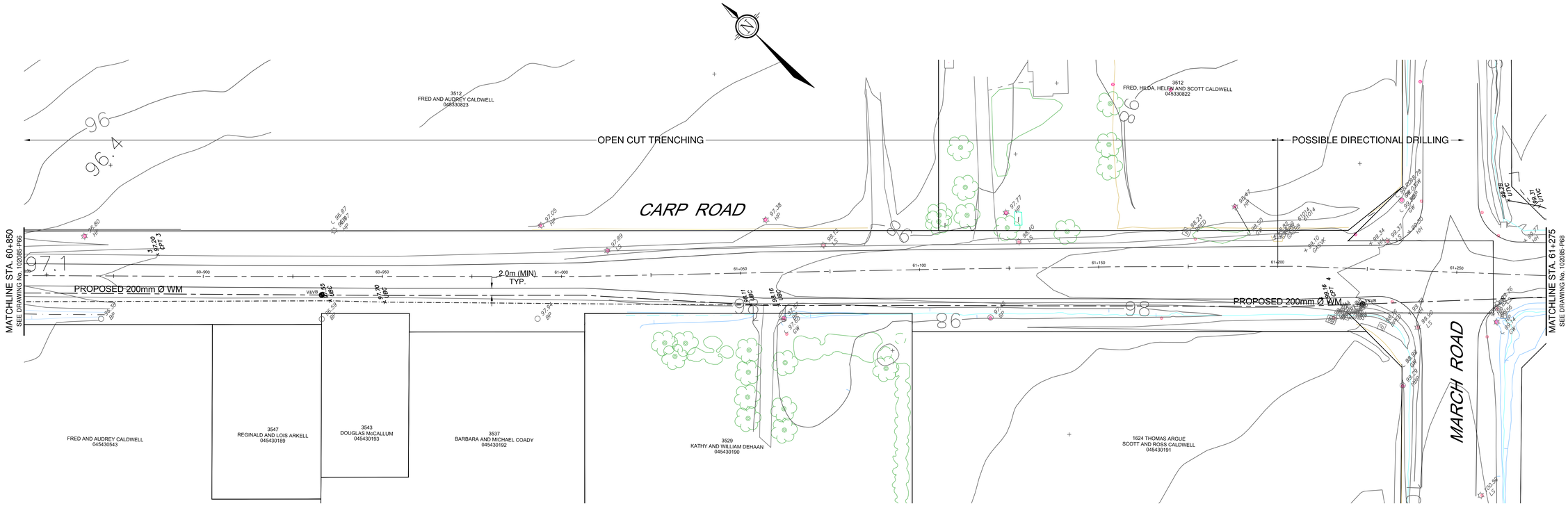

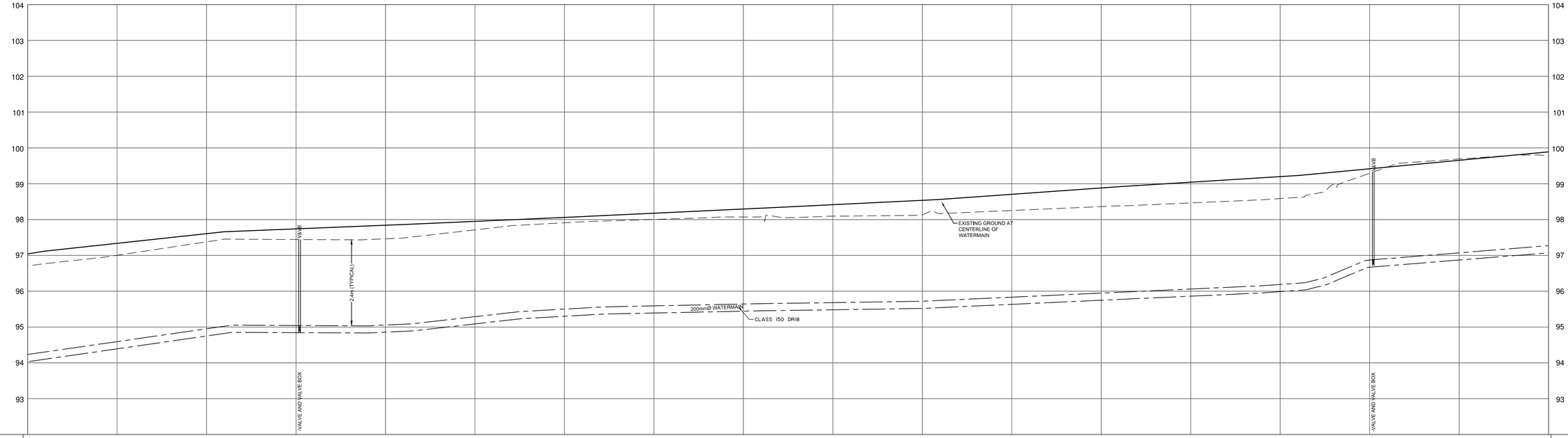

EXISTING CL ROAD ELEV.	97.04	97.34	97.61	97.74	97.84	97.95	98.06	98.18	98.29	98.42	98.54	98.71	98.88	99.04	99.20	99.42	99.65	99.89	EXISTING CL ROAD ELEV.
EXISTING ELEV. AT CL WM	96.70	97.00	97.38	97.44	97.46	97.71	97.91	98.03	98.07	98.09	98.13	98.25	98.36	98.46	98.59	99.29	99.69	99.76	EXISTING ELEV. AT CL WM
TOP OF WM ELEVATION	94.23	94.59	94.95	95.04 95.05	95.06	95.29	95.50	95.59	95.64	95.68	95.72	95.83	95.95	96.06	96.19	96.87 96.88	97.07	97.27	TOP OF WM ELEVATION
CHAINAGE	60+850	60+875	60+900	60+925 60+926	60+950	60+975	61+000	61+025	61+050	61+075	61+100	61+125	61+150	61+175	61+200	61+225 61+226	61+250	61+275	CHAINAGE

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1.	ISSUED FOR REVIEW	NOV 21/11	DJC

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HORIZONTAL
1:50
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VERTICAL

DESIGN HI
CHECKED SMG
DRAWN DJC
CHECKED LAB
APPROVED JR

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J.G. RIDDELL
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CITY OF OTTAWA
WEST CAPITAL AIRPARK

PLAN AND PROFILE OF
CARP ROAD
STATION 60+850 TO 61+275

PROJECT No. 102085-01
REV REV # 6
DRAWING No. 102085-P67

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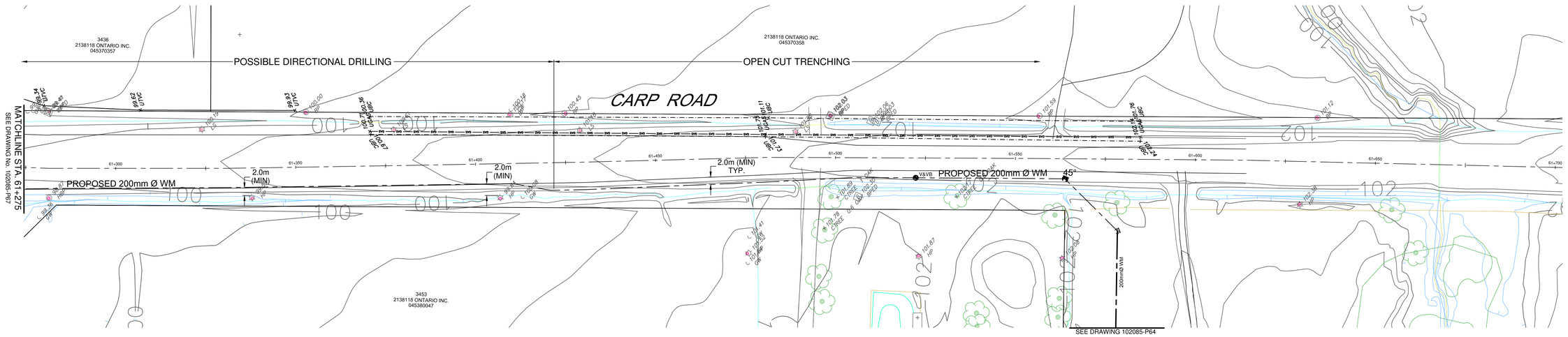
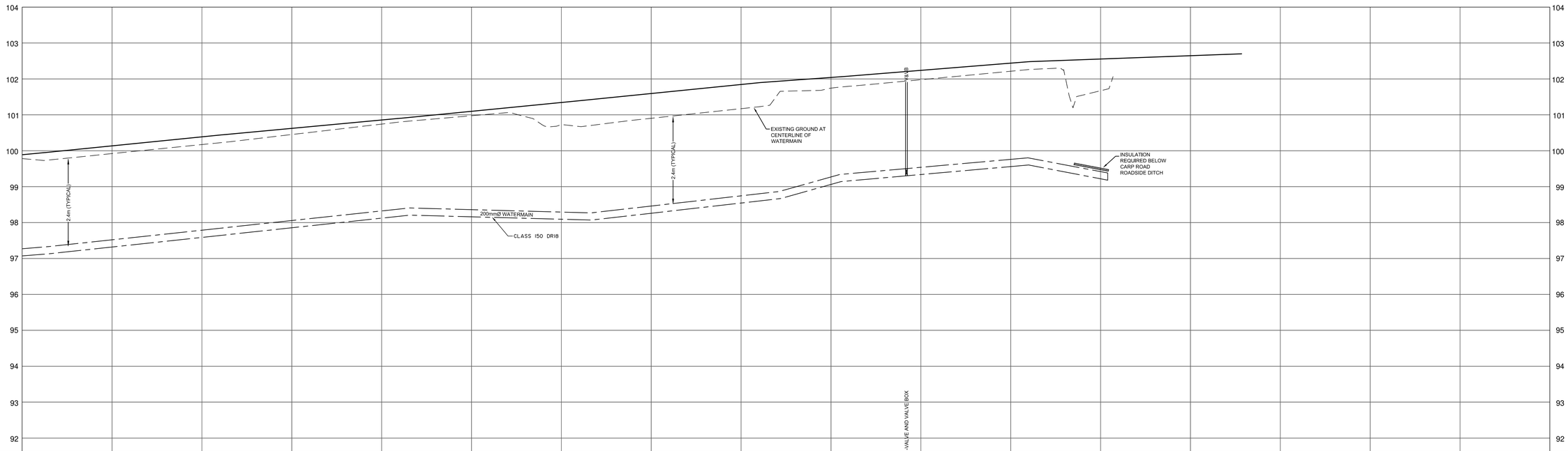


WEST CAPITAL AIRPARK



CHAINAGE	61+275	61+300	61+325	61+350	61+375	61+400	61+425	61+450	61+475	61+500	61+521	61+525	61+550	61+575	61+600	61+625	61+650	61+675	61+700	CHAINAGE
EXISTING CL ROAD ELEV.	99.89	100.14	100.39	100.62	100.86	101.10	101.34	101.59	101.84	102.04	102.24		102.44	102.55	102.65					EXISTING CL ROAD ELEV.
EXISTING ELEV. AT CL WM	99.78	99.82	100.17	100.45	100.74	100.97	100.73	100.90	101.17	101.74	101.98		102.21	101.67						EXISTING ELEV. AT CL WM
TOP OF WM ELEVATION	97.27	97.52	97.79	98.06	98.32	98.36	98.29	98.46	98.74	99.27	99.50	99.54	99.76	99.42						TOP OF WM ELEVATION

NOTE:
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WEST CAPITAL Developments

No.	REVISION	DATE	BY
6.	ISSUED FOR PHASE 1 RESIDENTIAL REGISTRATION	OCT 15/14	DJC
5.	REVISED PER CITY/MVC COMMENTS	SEPT 26/13	DJC
4.	REVISED PER CITY/MVC COMMENTS	MAY 28/13	DJC
3.	ISSUED TO THE CITY OF OTTAWA	JUL 17/12	DJC
2.	REVISED AS PER CITY COMMENTS	MAR 8/12	DJC
1.	ISSUED FOR REVIEW	NOV 21/11	DJC

SCALE
1:500 HORIZONTAL (0, 5, 10, 15, 20)
1:50 VERTICAL (0, 0.5, 1.0, 1.5, 2.0)

DESIGN HI
CHECKED SMG
DRAWN DJC
CHECKED LAB
APPROVED JGR

FOR REVIEW ONLY

REGISTERED PROFESSIONAL ENGINEER — J.G. RIDDELL — PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
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Website www.novatech-eng.com

CITY OF OTTAWA
WEST CAPITAL AIRPARK

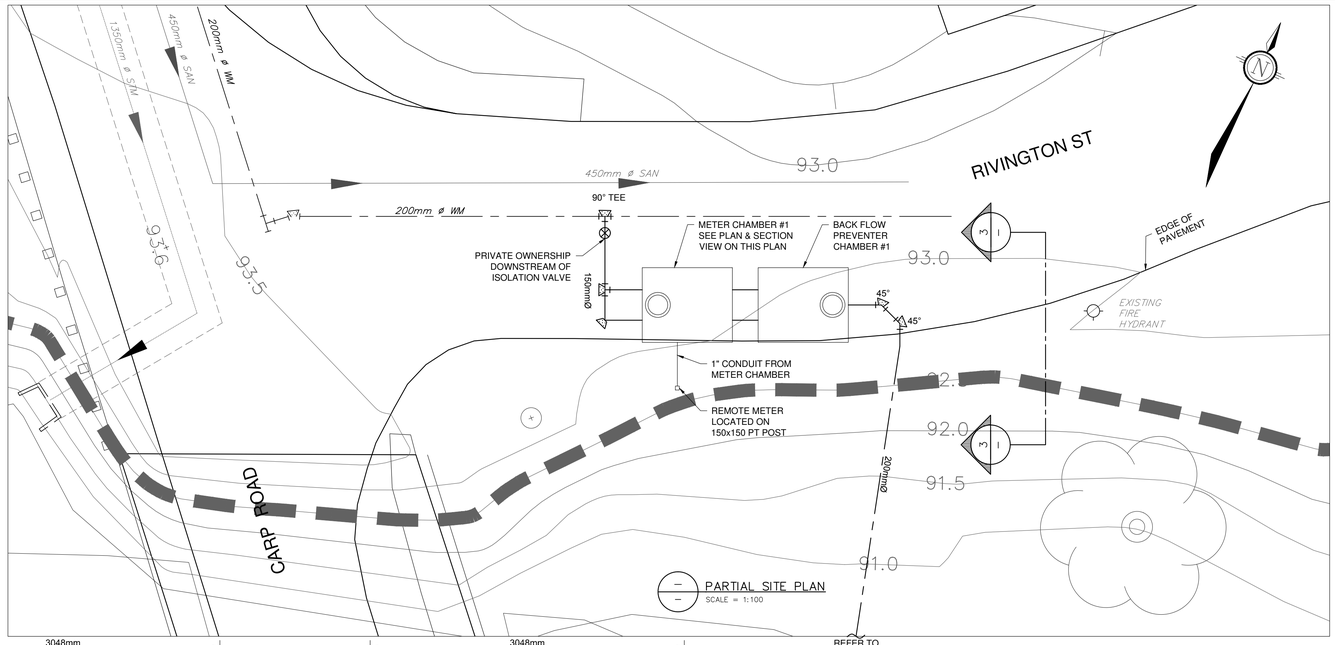
PLAN AND PROFILE OF
CARP ROAD
STATION 61+275 TO 61+700

PROJECT No. 102085-01
REV REV # 6
DRAWING No. 102085-P68

M:\2010\102085\CAD\102085-1CAD\design\Carp\102085-CPH2.dwg, P68, Nov 19, 2014 - 3:57pm, dcolley

PLEASE PRINT LANDSCAPE - 11X17

NOTES:
1) N.O. = NORMALLY OPEN N.C. = NORMALLY CLOSE
2) PROVIDE 50Ø BALL VALVES AT HIGH & LOW POINTS OF EACH SECTION OF WATERMAIN WHICH CAN BE ISOLATED.



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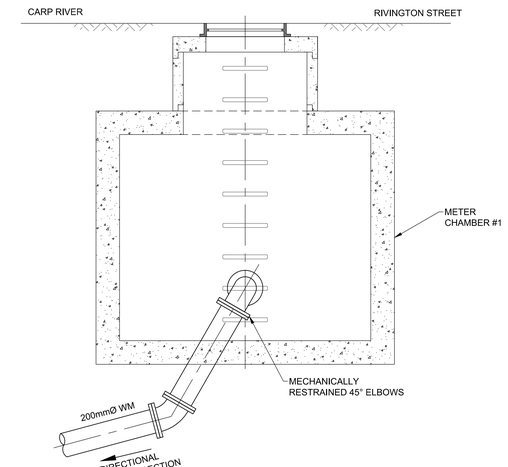
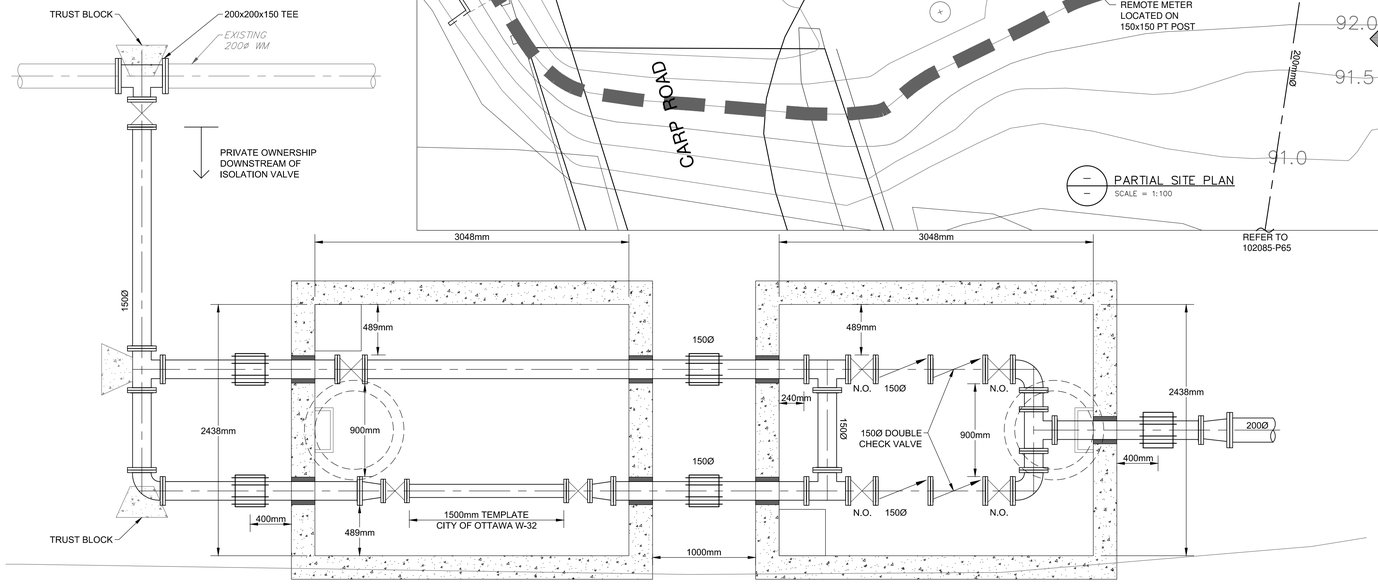
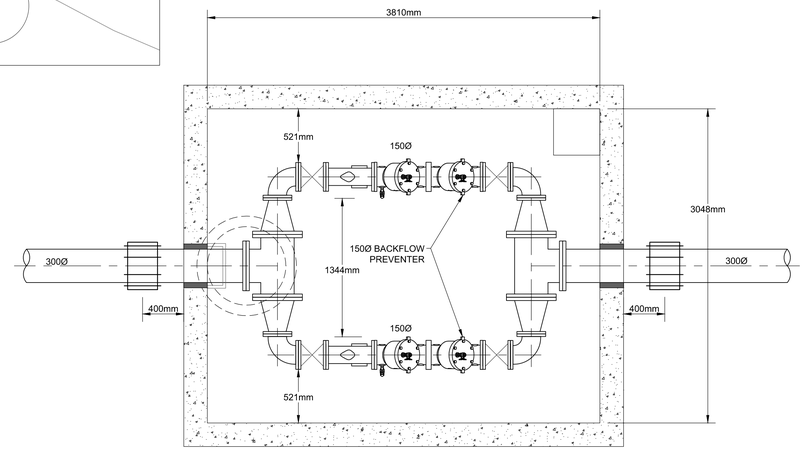


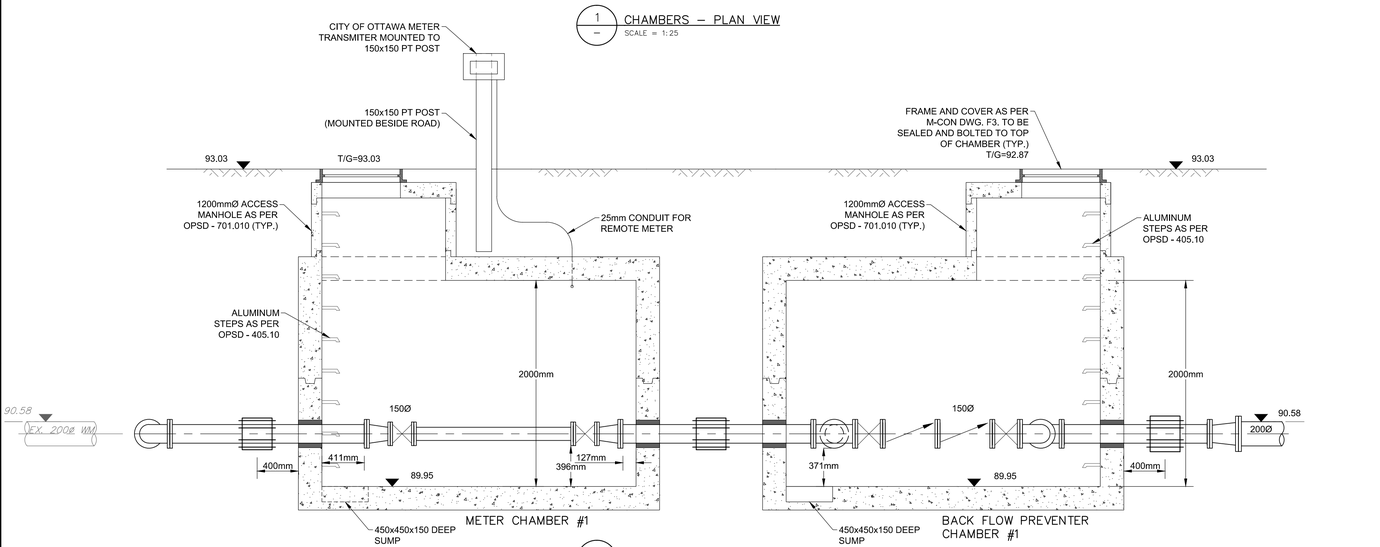
3 — SECTION
SCALE = 1:25



1 — CHAMBERS – PLAN VIEW
SCALE = 1:25



4 — BACKFLOW PREVENTER CHAMBER #2 – PLAN VIEW
SCALE = 1:25 REFER TO DRAWING 102085-P63 FOR LOCATION



2 — CHAMBERS – SECTION VIEW
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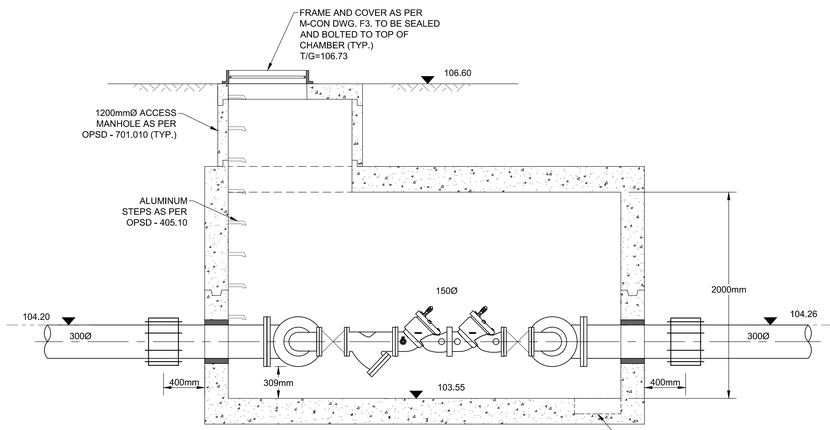

5 — BACKFLOW PREVENTER CHAMBER #2 – SECTION VIEW
SCALE = 1:25 REFER TO DRAWING 102085-P63 FOR LOCATION

NOTE:
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3.	ISSUED TO THE CITY OF OTTAWA	JUL 17/12	CJS
2.	REVISED AS PER CITY COMMENTS	MAR. 8/12	BBH
1.	ISSUED FOR REVIEW	NOV. 21/2011	CJS

SCALE
AS SHOWN
1:100
0 1 2 3 4

DESIGN CJS
CHECKED CJS
DRAWN LLW
CHECKED CJS
APPROVED CJS

FOR REVIEW ONLY

REGISTERED PROFESSIONAL ENGINEER
C.J. SCIUK
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NOVATECH
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CITY OF OTTAWA
WEST CAPITAL AIRPARK

WATERMAIN DETAILS PLAN

PROJECT No. 102085-01
REV REV # 6
DRAWING No. 102085-D7

M:\2010\102085\CAD\102085-1CAD\design\Water Storage Facility\102085-D7.dwg, D7, Sep 24, 2014 - 3:36pm, lwang

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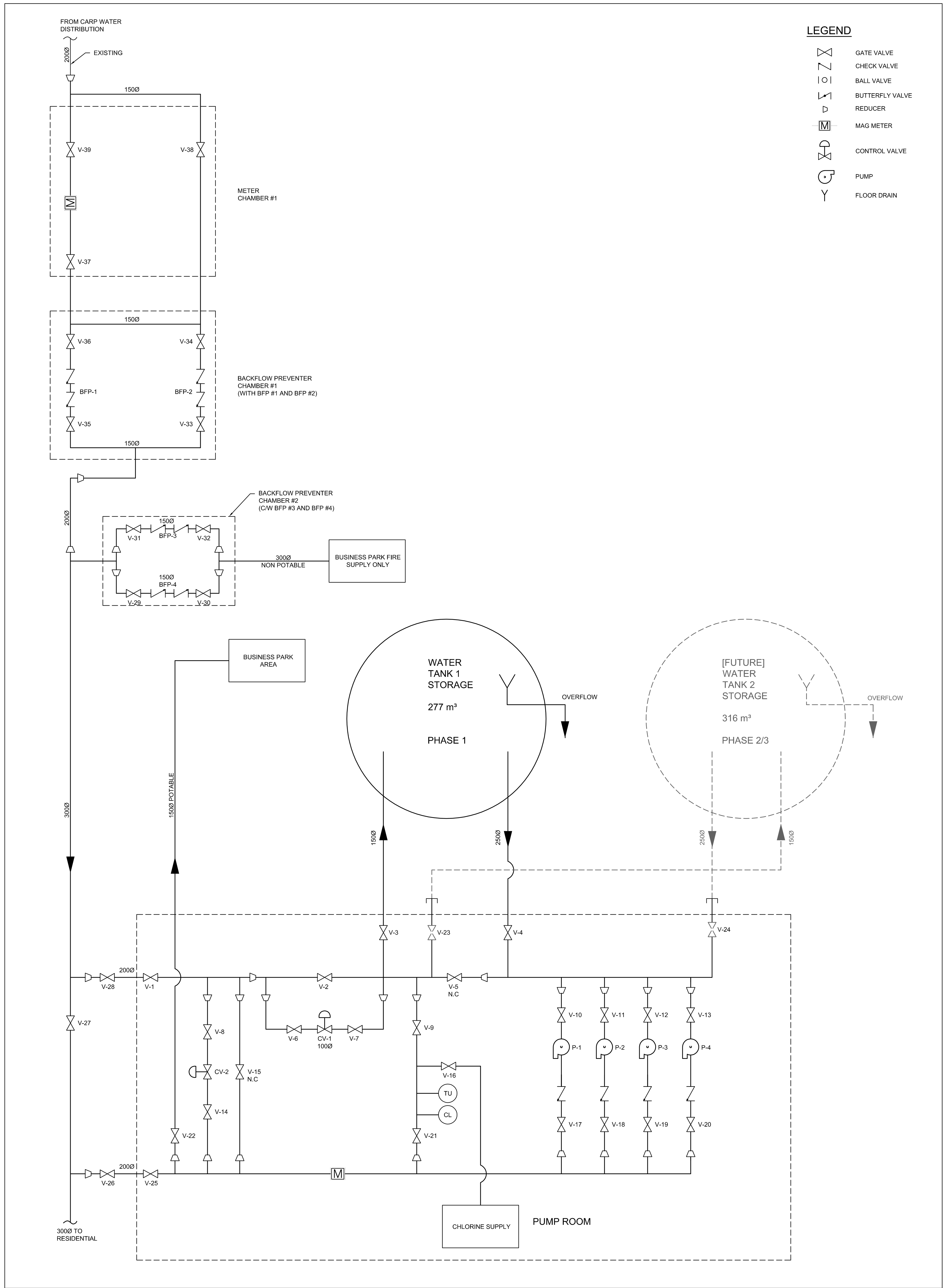

1 / W1 WATER STORAGE FACILITY PROCESS SCHEMATIC

N.T.S.

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WEST CAPITAL Developments

No.	REVISION	DATE	BY
3.	REVISED PER CITY / MVC COMMENTS	SEPT 26/13	CJS
2.	ISSUED WITH REVISED HYDRAULIC NETWORK REPORT	MAY 28/13	CJS
1.	ISSUED FOR REVIEW	MAY 18/2012	CJS

SCALE: AS SHOWN

DESIGN: CJS
CHECKED: CJS
DRAWN: LLW
CHECKED: CJS
APPROVED: SMG

FOR REVIEW ONLY

NOVATECH

REGISTERED PROFESSIONAL ENGINEER C.J. SCIUK PROVINCE OF ONTARIO

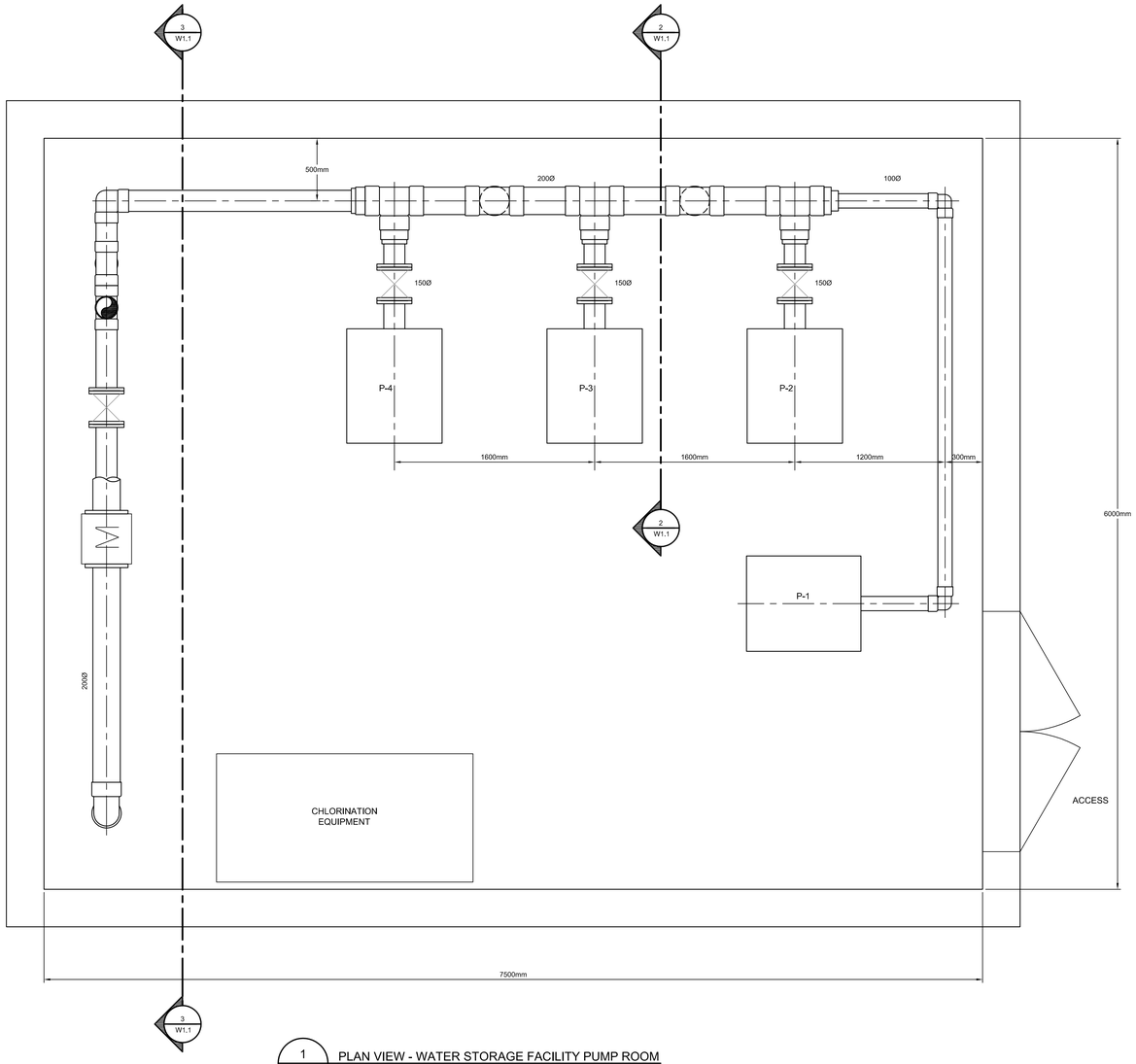
NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada
K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

LOCATION
CITY OF OTTAWA
WEST CAPITAL AIRPARK

DRAWING NAME
WATER STORAGE FACILITY PROCESS - SCHEMATIC

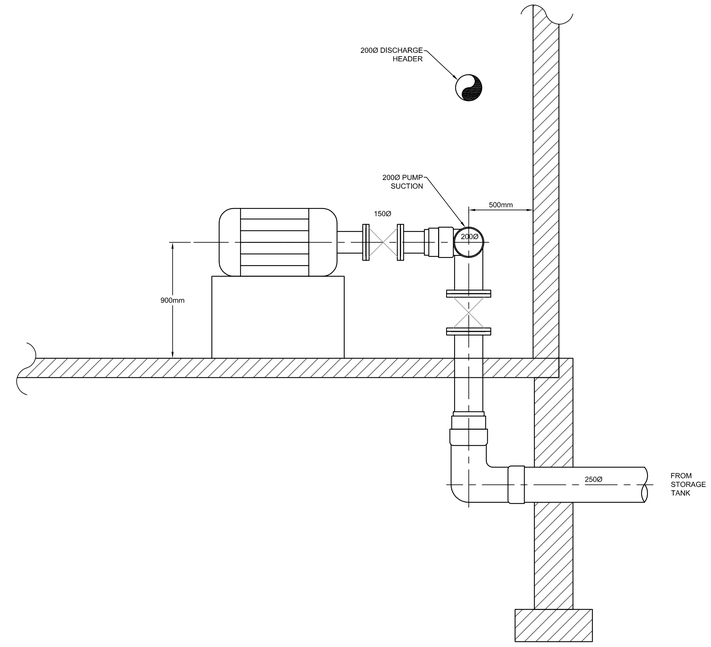
PROJECT No. 102085-01
REV: REV # 3
DRAWING No. 102085-W1

PRELIMINARY



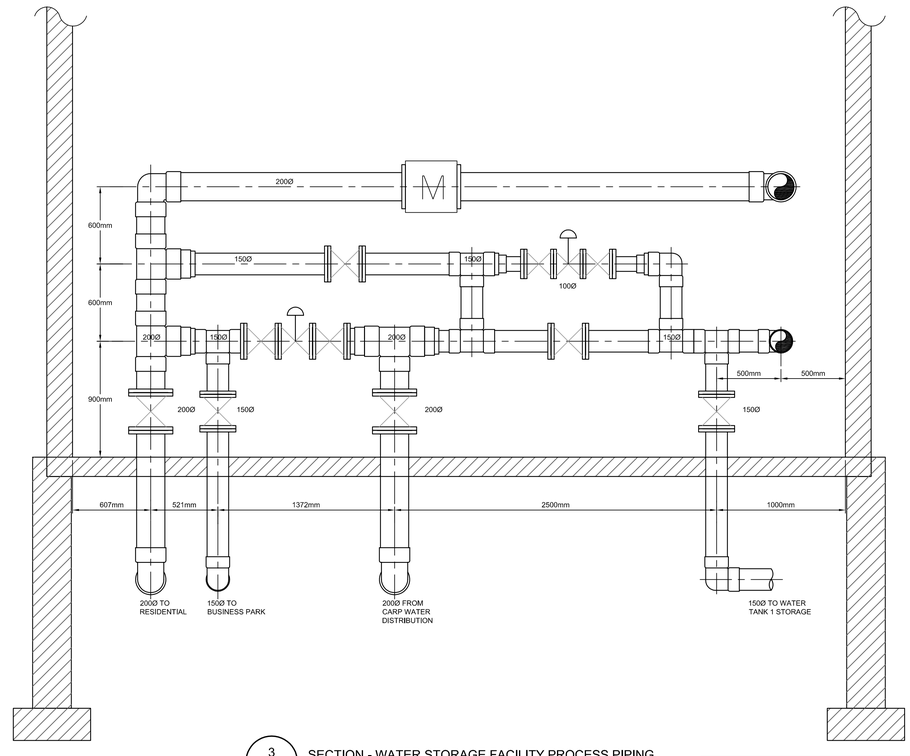
1 / W1.1 PLAN VIEW - WATER STORAGE FACILITY PUMP ROOM

SCALE 1:20



2 / W1.1 SECTION - WATER STORAGE FACILITY PROCESS PIPING

SCALE 1:20



3 / W1.1 SECTION - WATER STORAGE FACILITY PROCESS PIPING

SCALE 1:20

PRELIMINARY

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1.	ISSUED FOR REVIEW	MAY 18/2012	CJS

SCALE: AS SHOWN

DESIGN	CJS
CHECKED	CJS
DRAWN	LLW
CHECKED	CJS
APPROVED	SMG

FOR REVIEW ONLY

NOVATECH — REGISTERED PROFESSIONAL ENGINEER — C. J. SCIUK — PROVINCE OF ONTARIO — NOVATECH

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LOCATION
CITY OF OTTAWA
WEST CAPITAL AIRPARK

DRAWING NAME
WATER STORAGE FACILITY
PROCESS - PUMP ROOM
(SECTIONS)

PROJECT No. 102085-01
REV REV # 3
DRAWING No. 102085-W1.1

M:\2002\102085\CAD\102085-HCADdrawings\WaterStorageFacility\102085-W1&W1.1.dwg, W1.1, Sep 24, 2013 - 10:18am, Bowley

PLAMBT.DWG - 1000mm/1000mm

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-1643-01 - 273-275 Russ Bradley - Water Demands

Project:	273-275 Russ Bradley
Project No.:	CCO-22-1643-01
Designed By:	FV
Checked By:	NV
Date:	September 14, 2023
Site Area:	2.43 gross ha

Commercial 6326 m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.20	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d

MAXIMUM DAILY DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.31	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d

MAXIMUM HOUR DEMAND	Residential	0.00	L/s
	Commercial/ Industrial/ Institutional	0.55	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.20	L/s
MAXIMUM DAILY DEMAND	0.31	L/s
MAXIMUM HOUR DEMAND	0.55	L/s

McINTOSH PERRY

CCO-22-1643-01 - 273-275 Russ Bradley - Fire Underwriters Survey -Building F

Project:	273-275 Russ Bradley
Project No.:	CCO-22-1643-01
Designed By:	FV
Checked By:	NV
Date:	October 4, 2023

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where:

F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type Ordinary Construction

C	1	**A**	**743.2** m^2	
	Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area)		**500.0** m^2	**Max area to be 500m2 due to fire separation*
Calculated Fire Flow			**4,919.3 L/min**	
			5,000.0 L/min	

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Combustible	0%	
Fire Flow		**5,000.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered	0%	
Reduction		**0.0 L/min**

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	3.1 to 10	Ordinary - Mass Timber (Unprotected)	60.96	1	61.0	12%
Exposure 2	Over 30 m	Ordinary - Mass Timber (Unprotected)	0	0	0.0	0%
Exposure 3	3.1 to 10	Ordinary - Mass Timber (Unprotected)	60.96	1	61.0	12%
Exposure 4	10.1 to 20	Ordinary - Mass Timber (Unprotected)	12.19	1	12.2	5%
					% Increase*	**29%**

Increase*	**1,450.0 L/min**

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	**6,450.0 L/min**
Fire Flow Required**	**6,000.0 L/min**

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-1643-01 - 273-275 Russ Bradley Road - Sanitary Demands

Project:	273-275 Russ Bradley Road
Project No.:	CCO-22-1643-01
Designed By:	FV
Checked By:	BC
Date:	Dec-22

Site Area	2.43	Gross ha
Office Space	55.40	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	
Residential Peaking Factor	3.80	* Using Harmon Formula = 1+(14/(4+P^0.5))*0.8 where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.12
Wet	0.68
Total	0.80

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d		0
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2/d)		0
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d	55.7	0.01
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

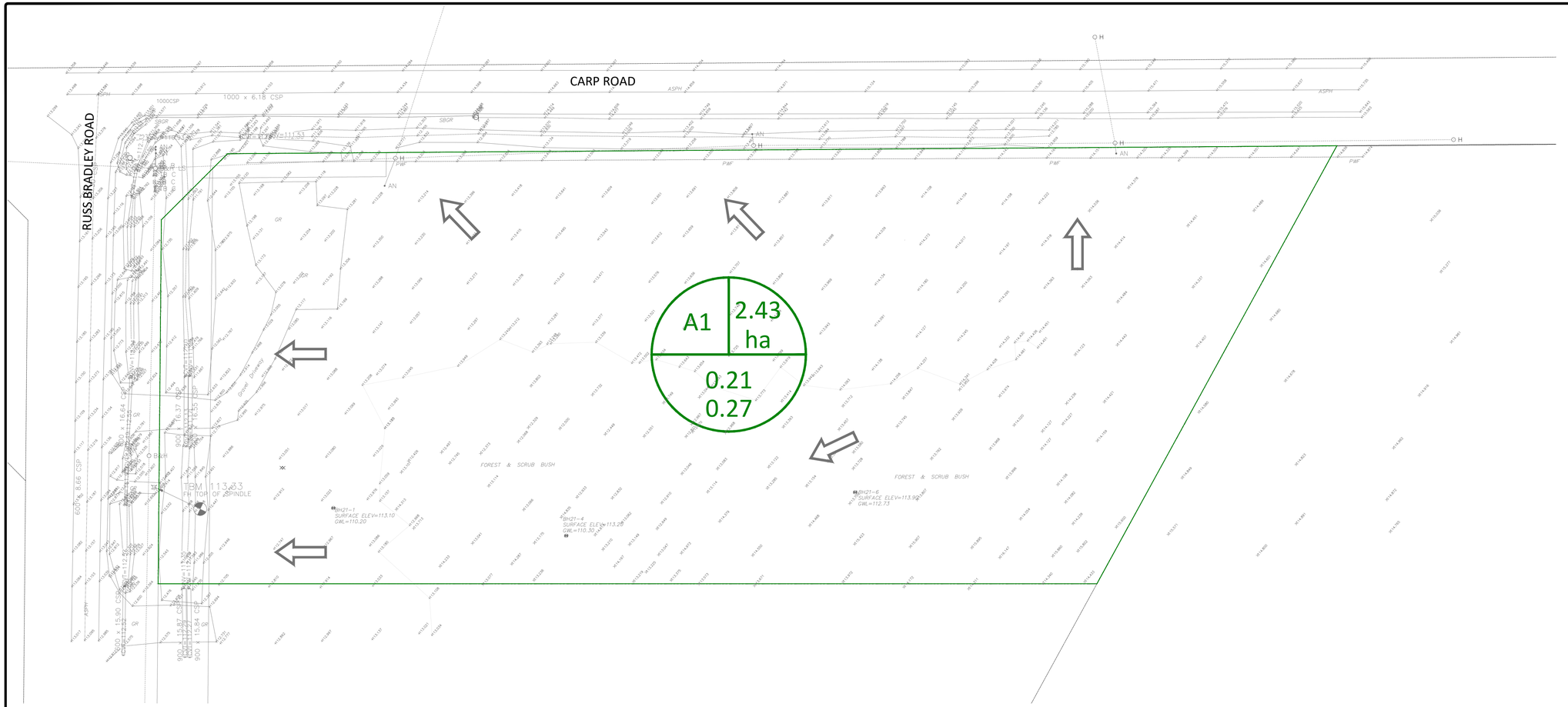
AVERAGE RESIDENTIAL FLOW	0.00	L/s
PEAK RESIDENTIAL FLOW	0.00	L/s
AVERAGE ICI FLOW	0.01	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.01	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.01	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.13	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.13	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.81	L/s

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

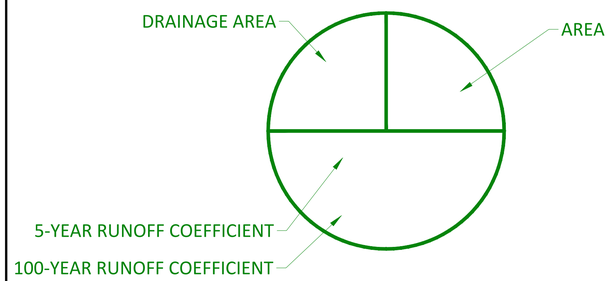
McINTOSH PERRY

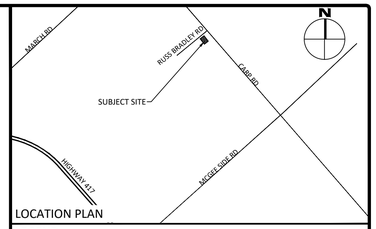


GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) MCINTOSH PERRY SURVEYING INC. JOB # 22-2317 AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OR TOWNSHIP BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY OR TOWNSHIP AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL DELETERIOUS MATERIAL, SUCH AS ASPHALT, CURBING, EXISTING STOCKPILES, GRANULAR MATERIALS AND DEBRIS OFF SITE.
8. TOPSOIL TO BE STRIPPED AND REMOVED OFF SITE. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE CITY OR TOWNSHIP.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY OR TOWNSHIP STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
13. CONTACT THE CITY OR TOWNSHIP FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY OR TOWNSHIP SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
14. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
15. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO OTTAWA,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
17. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO OTTAWA, BELL AND THE CITY OR TOWNSHIP.
18. ALL PROPOSED CURB SHALL BE CONCRETE BARRIER CURB UNLESS SPECIFIED.
19. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY OR TOWNSHIP.

LEGEND:





LOCATION PLAN

LEGEND

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
2	ISSUED FOR REVIEW	OCT. 03, 2023
1	ISSUED FOR REVIEW	DEC. 23, 2022

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SCALE 1 : 500
0 10 20 30 40 50 Metres

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Client:
TREVOR WATKINS
273 & 275 RUSS BRADLEY ROAD
CARP, ON K0A 1L0

Project:
WAREHOUSE/STORAGE FACILITY
273 & 275 RUSS BRADLEY ROAD
CARP ON

Drawing Title:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:500	Project Number: CCO-22-1643-01
Drawn By: NV	
Checked By: BC	Drawing Number: PRE
Designed By: NV	

D07-12-22-0187

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FILENAME: I:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-1643-01 Trevor Watkins SPC 1900 Thomas Argue\12 - Drawings\CCO-22-1643-01_PRESENTATION.dwg
LAST SAVED: Tuesday, October 03, 2023 LAST SAVED BY: I.Valenti
LAST PLOTTED: Tuesday, October 03, 2023 [8:18 PM EDT]

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

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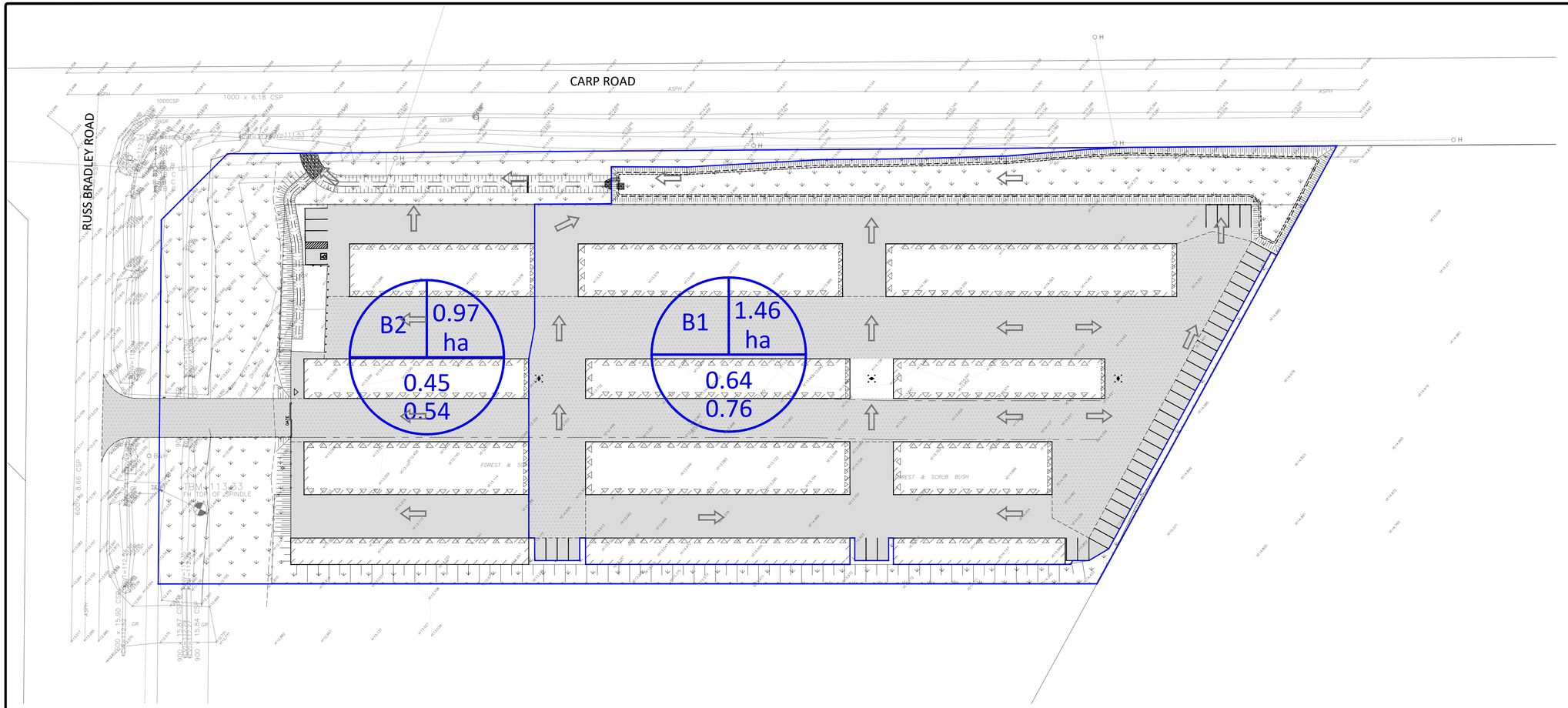
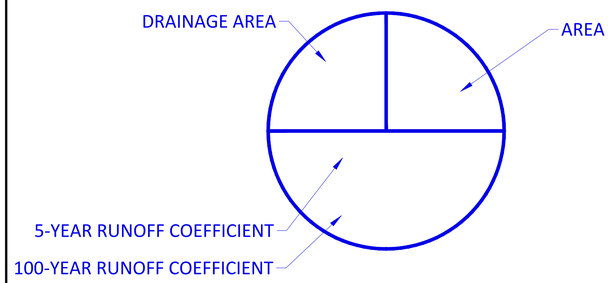
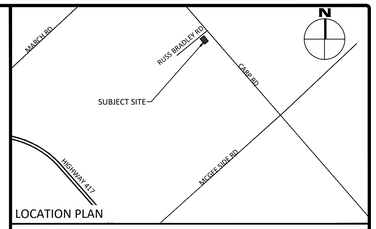


GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) MCINTOSH PERRY SURVEYING INC. JOB # 22-2317 AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE PRECISE LOCATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OR TOWNSHIP BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY OR TOWNSHIP AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL DELETERIOUS MATERIAL, SUCH AS ASPHALT, CURBING, EXISTING STOCKPILES, GRANULAR MATERIALS AND DEBRIS OFF SITE.
8. TOPSOIL TO BE STRIPPED AND REMOVED OFF SITE. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
11. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE CITY OR TOWNSHIP.
12. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY OR TOWNSHIP STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
13. CONTACT THE CITY OR TOWNSHIP FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY OR TOWNSHIP SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
14. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
15. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO OTTAWA,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
17. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO OTTAWA, BELL AND THE CITY OR TOWNSHIP.
18. ALL PROPOSED CURB SHALL BE CONCRETE BARRIER CURB UNLESS SPECIFIED.
19. ALL EXISTING REDUNDANT PRIVATE APPROACHES FRONTING THIS DEVELOPMENT MUST BE REMOVED TO THE SATISFACTION OF THE CITY OR TOWNSHIP.

LEGEND:





LOCATION PLAN

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Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale: 1:500	Project Number: CCO-22-1643-01
Drawn By: NV	
Checked By: JH	Drawing Number: POST
Designed By: NV	

D07-12-22-0187
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APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CCO-22-1643-01 - 273&275 Russ Bradley - Runoff Calculations

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 5-Year	C_{AVG} 100-Year
A1	2.425	0.00	0.90	805.20	0.60	23,441.53	0.20	0.21	0.27

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	2.425	0.21	0.27	15	82.8	141.6	119.04	254.44
Total	2.425						119.04	254.44

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	C_{AVG} 5-Year	C_{AVG} 100-Year
B1	1.458	4,365.86	0.90	8,294.52	0.60	1,923.61	0.20	0.64	0.76
B2	0.966	1,987.55	0.90	2,675.96	0.60	4,999.23	0.20	0.45	0.54

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
B1	1.458	0.64	0.76	10	104.2	178.6	269.11	549.39
B2	0.966	0.45	0.54	15	82.8	141.6	101.15	206.42
Total	2.425						370.26	755.81

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	2.425	0.21	0.27	15	82.8	141.6	119.04	254.44
Total	2.425						119.04	254.44

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)		Restricted Flow (L/s)		Storage Required (m^3)		Storage Provided (m^3)		
	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	
B1	269.11	549.39	11.97	48.00	275.92	446.98	277.41	459.40	Restricted
B2	101.15	206.42	101.15	206.42					Unrestricted
Total	370.26	755.81	113.12	254.42	275.92	446.98	277.41	459.40	

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
50	37.7	97.25	11.97	85.28	255.83
60	32.9	85.09	11.97	73.11	263.21
70	29.4	75.86	11.97	63.89	268.33
80	26.6	68.60	11.97	56.63	271.83
90	24.3	62.73	11.97	50.76	274.10
100	22.4	57.87	11.97	45.90	275.40
110	20.8	53.78	11.97	41.81	275.92
120	19.5	50.28	11.97	38.31	275.81
130	18.3	47.25	11.97	35.28	275.17
140	17.3	44.60	11.97	32.63	274.07

Maximum Storage Required 5-Year (m^3) =	275.92

100-Year Storm Event

Tc (min)	I (mm/hr)	B1 Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
30	91.9	282.66	48.00	234.66	422.39
35	82.6	254.08	48.00	206.08	432.76
40	75.1	231.21	48.00	183.21	439.70
45	69.1	212.45	48.00	164.45	444.03
50	64.0	196.77	48.00	148.77	446.32
55	59.6	183.45	48.00	135.45	446.98
60	55.9	171.98	48.00	123.98	446.31
65	52.6	161.98	48.00	113.98	444.53

Maximum Storage Required 100-Year (m^3) =	446.98

Storage Occupied In Area B1

5-Year Storm Event

Water Elev. (m) =			114.13		
Structure	INV. (out)	Depth (m)	Head (m)	Volume (m^3)	
SWM Area	113.99	0.23	0.07	277.41	*
				Total	

Storage Available (m^3) =	277.41
Storage Required (m^3) =	275.92

100-Year Storm Event

Water Elev. (m) =			114.26		
Structure	INV. (out)	Depth (m)	Head (m)	Volume (m^3)	
SWM Area	113.99	0.36	0.20	459.40	*
				Total	

Storage Available (m^3) =	459.40
Storage Required (m^3) =	446.98

* Storage Calculated in AutoCAD

For Orifice Flow, C= 0.60
For Weir Flow, C= 1.84

	Orifice 1	Orifice 2	Weir 1	
invert elevation	113.99		114.19	
center of crest elevation	114.07			
orifice width / weir length	150 mm		0.80 m	
orifice height				
orifice area (m^2)	0.018	0.000		

Elevation Discharge Table - Storm Routing

Elevation	Orifice 1		Orifice 2		Weir 1		Weir 2		Total
	H [m]	Q [m^3]	H [m]	Q [m^3]	H [m]	Q [m^3]	H [m]	Q [m^3]	Q [l/s]
114.06	x	x			x	x			0.00
114.07	0.01	0.003			x	x			3.32
114.08	0.02	0.006			x	x			5.75
114.09	0.03	0.007			x	x			7.43
114.10	0.04	0.009			x	x			8.79
114.11	0.05	0.010			x	x			9.96
114.12	0.06	0.011			x	x			11.01
114.13	0.07	0.012			x	x			11.97
114.14	0.08	0.013			x	x			12.86
114.15	0.09	0.014			x	x			13.69
114.16	0.10	0.014			x	x			14.48
114.17	0.11	0.015			x	x			15.22
114.18	0.12	0.016			x	x			15.93
114.19	0.13	0.017			x	x			16.60
114.20	0.14	0.017			0.01	0.00			18.73
114.21	0.15	0.018			0.02	0.00			22.05
114.22	0.16	0.018			0.03	0.01			26.14
114.23	0.17	0.019			0.04	0.01			30.85
114.24	0.18	0.020			0.05	0.02			36.10
114.25	0.19	0.020			0.06	0.02			41.83
114.26	0.20	0.021			0.07	0.03			48.00
114.27	0.21	0.021			0.08	0.03			54.57
114.28	0.22	0.022			0.09	0.04			61.52
114.29	0.23	0.022			0.10	0.05			68.83
114.30	0.24	0.023			0.11	0.05			76.47
114.31	0.25	0.023			0.12	0.06			84.44
114.32	0.26	0.024			0.13	0.07			92.71
114.33	0.27	0.024			0.14	0.08			101.28
114.34	0.28	0.025			0.15	0.09			110.14
114.35	0.29	0.025			0.16	0.09			119.28
114.36	0.30	0.026			0.17	0.10			128.69
114.37	0.31	0.026			0.18	0.11			138.35
114.38	0.32	0.026			0.19	0.12			148.27
114.39	0.33	0.027			0.20	0.13			158.43

Notes: 1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir flow calculated in Bentley's FlowMaster - Trapezoidal Channel at 0.8%, 3:1 side slopes, roughness coeff. Of 0.035
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

SOAKAWAY PIT INFILTRATION CALCULATION

Volume Required to be Infiltrated			
Required Infiltration Rate:	230	mm/yr	(Moderate Recharge Area per Figure 9.3 - Carp River Watershed / Subwatershed Study)
Site Area:	2.42	ha	
Required Infiltration Volume:	5577	m^3/yr	(Required Infiltration X Site Area)
Post-Dev Pervious Area:	0.69	ha	
Infiltration in Pervious Area:	1,592	m^3/yr	
Infiltration needed in Basin:	3,984	m^3/yr	

Annual Rainfall Data (Up to 25mm Storm Event)			
Number of events/yr 5mm<x<25mm:	51		
Average Days Between Events:	7.1		
Average Depth 5mm<x<25mm:	11.88	mm	
Site Area being collected	14583.99	m^2	
Cummulative Rainfall Depth 5mm<x<25mm:	605.88	mm/yr	(Number of Events X Average Depth)
Maximum Volume of Runoff per year to Infiltrate:	8836.15	m^3/yr	(Area X Cummulative Rainfall Depth)

Required Storage Volume (6mm)			
Required Storage Volume:	87.50	m^3	(Area x 6mm)
Assumed Porosity (n):	100%		(Surface Storage at Bottom of Pond)
Clearstone Volume:	87.50	m^3	(Storage Volume/n)
Total Volume Infiltrated :	4462.70	m^3/yr	6mm Event Volume X Number of Events Per Year)

Ponding Area Sizing			
Depth of Pond Area:	0.09	m	
Area:	1184.86	m^2	* calculated from AutoCAD
Volume:	101.29	m^3	* calculated from AutoCAD

Infiltration Rate Through Soil			
Percolation Rate:	21.2	mm/hr	(Lowest measured rate from percolation testing)
Percolation Rate:	2.5	mm/hr	(Factor of safety of 8.5 applied)
Infiltration Rate:	0.82	L/s	(Percolation Rate X Area of Ponding)

Retention Time (6 mm)			
Volume of Water during the 5mm event:	87.50	m^3	
Depth of Ponding Area:	0.09	m	
Time:	29.6	hr	(Volume / Infiltration Rate)
	1.23	days	

Time of Concentration Pre-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
A1	47	2.20	15	14

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c= Balanced Runoff Coefficient

L= Length of Drainage Area

S= Average Slope of Watershed

Time of Concentration Post-Development

Drainage Area ID	Sheet Flow Distance (m)	Slope of Land (%)	Tc (min) (5-Year)	Tc (min) (100-Year)
B2	81	2.04	15	13

Tc= (3.26(1.1-c)L^0.5/S^0.33)

c= Balanced Runoff Coefficient

L= Length of Drainage Area

S= Average Slope of Watershed

Runoff Calculations

Swale	Tc (min)	I (mm/hr)	I (mm/hr)	Area Tributary To Swale (ha)	Average C (5-year)	Average C (100-year)	Runoff (m^3/s) (5-Year)	Runoff (m^3/s) (100-Year)	Notes
North	10	104.2	178.6	1.69	0.65	0.78	0.014*	0.053*	*Controlled
West	10	104.2	178.6	0.25	0.69	0.82	0.049	0.100	-

Manning's Equation For Channels:

$$Q = \frac{k}{n} A \left(\frac{A}{Pw}\right)^{2/3} S^{1/2}$$

Where

Q= Volumetric Flow Rate [m^3/s]
k= Dimensionless Unit Conversion Factor [1 for Metric Units]
n= Manning Roughness Coefficient (Per Chow, 1959)
A= Cross sectional Flow Area [m^2] (Smallest cross sectional area assumed)
Pw= Wetted Perimeter [m] (smallest wetted permiter assumed)
S= Stream Slope [dimensionless](smallest slope assuemd)

Capacity Calculations

Swale	Channel Material	Manning's n Value	Max Cross-Sectional Area (m^2)	Max Wetted Perimeter (m)	Slope (m/m)	Maximum Capacity (m^3/s)	Occupied Capacity (5-Year)	Occupied Capacity (100-Year)
North	Grass	0.025	1.25	7.32	0.010	1.54	1%	3%
West	Grass	0.025	0.53	2.75	0.005	0.49	10%	20%

Velocity Calculations

Swale	Cross-Sectional Area at Flow Depth (m^2)		Runoff (m^3/s)		Flow Velocity (m/s)	
	(5-Year)	(100-Year)	(5-Year)	(100-Year)	(5-Year)	(100-Year)
North	0.08	0.17	0.014*	0.053*	0.183	0.312
West	0.13	0.20	0.049	0.100	0.389	0.488

APPENDIX H
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

Criteria	Location (if applicable)
☐ Executive Summary (for larger reports only).	N/A
☐ Date and revision number of the report.	On Cover
☐ Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix A
☐ Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Summary of pre-consultation meetings with City and other approval agencies.	Appendix B
☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading Plan (C101)
☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading Plan (C101)
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Background Studies, Standards and References
☐ All preliminary and formal site plan submissions should have the following information: o Metric scale o North arrow (including construction North) o Key plan o Name and contact information of applicant and property owner o Property limits including bearings and dimensions o Existing and proposed structures and parking areas o Easements, road widening and rights-of-way o Adjacent street names	Site Grading Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
☐ Confirm consistency with Master Servicing Study, if available	N/A
☐ Availability of public infrastructure to service proposed development	N/A
☐ Identification of system constraints	N/A
☐ Identify boundary conditions	Appendix C
☐ Confirmation of adequate domestic supply and pressure	N/A
☐ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Appendix C
☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐ Address reliability requirements such as appropriate location of shut-off valves	N/A
☐ Check on the necessity of a pressure zone boundary modification.	N/A
☐ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Appendix C, Section 4.2

☐ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Site Servicing Plan (C101)
☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☐ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix C
☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
☐ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	N/A
☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2 Proposed Sanitary Sewer

☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 5.3 Proposed Sanitary Design
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Proposed Sanitary Sewer
☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐ Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
☐ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Analysis of available capacity in existing public infrastructure.	N/A
☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
☐ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5-year event (dependent on the receiving sewer design) to 100-year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Set-back from private sewage disposal systems.	N/A
☐ Watercourse and hazard lands setbacks.	N/A
☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☐ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5-year return period) and major events (1:100-year return period).	Appendix G

☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Site Grading Plan
☐ Calculate pre-and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 7.0 Proposed Stormwater Management Appendix G
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐ Identification of potential impacts to receiving watercourses	N/A
☐ Identification of municipal drains and related approval requirements.	N/A
☐ Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.0 Stormwater Sewer Design & Section 7.0 Proposed Stormwater Management
☐ 100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Grading Plan (C101)
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 8.0 Sediment & Erosion Control
☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐ Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

Criteria	Location (if applicable)
☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐ Changes to Municipal Drains.	N/A
☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	Section 9.0 Summary Section 10.0 Recommendations
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped